



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

SITE: Chevron Ortho
BREAK: 10.11.97
OTHER: _____

4EAD

VIA FACSIMILE: (510) 842 4506

Ms. Judith P. Knapp
Chevron Chemical Company
6001 Bollinger Canyon Road
San Ramon, CA 94583-0947

**Re: Unilateral Administrative Order for Remedial Design
and Remedial Action, for the Chevron Chemical Site
in Orange County, Florida**

Dear Judith:

On last Wednesday, August 6, 1997, Randy Bryant of U.S. EPA and Larry Kirchner of Chevron discussed by telephone Chevron's concerns with the UAO dated July 22, 1997. The UAO became effective the day following this telephone call, or August 7, 1997. All times for performance of ordered activities pursuant to the UAO shall be calculated from this effective date.

If you have any questions, please do not hesitate to call me at (404) 562-9557.

Sincerely,

Rudolph C. Tanasijevich
Assistant Regional Counsel

cc: Randy Bryant



10482399



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

JUL 22 1997

4EAD

UNILATERAL ADMINISTRATIVE ORDER
FOR REMEDIAL DESIGN AND REMEDIAL ACTION
URGENT LEGAL MATTER
CERTIFIED MAIL--RETURN RECEIPT REQUESTED

Ms. Judy Knapp
Chevron Chemical Company
6001 Bollinger Canyon Road
San Roman, CA 94583

SUBJECT: Issuance of Unilateral Administrative Order for
Remedial Design and Remedial Action, for the
Chevron Chemical Site in Orange County, Florida

Dear Ms. Knapp:

Pursuant to the authority of Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), EPA is issuing the enclosed Unilateral Administrative Order ("UAO") to the Chevron Chemical Company ("Chevron"). The UAO requires that Chevron conduct Remedial Design and Remedial Action work to address the contamination at the Site.

You should note Section XXIII (Opportunity to Confer), and Section XXVII (Effective Date). This Order is effective 15 days after receipt of the Order by Chevron, unless a conference is requested by the company. If a conference is requested, the Order is effective the day following the conference, unless modified by EPA. To request a conference you may call Rudolph C. Tanasijevich, Assistant Regional Counsel, at (404) 562-9557, within five days of receipt of this Order. Such request may be made by leaving a voice mail message, and shall be confirmed in writing on the day of the request. Any such conference will be conducted by telephone conference call within five days after the request is made unless extended by agreement of the parties.

You should also note Section XXIX ("Notice of Intent to Comply"). Chevron is required to notify EPA within five days of the effective date of its unequivocal intent to comply with this Order. Failure to provide notice of intent to comply as required by Section XXIX will constitute a violation of the Order. In the event that Chevron does not comply with the Order, EPA intends to complete the removal and seek recovery of its costs and appropriate penalties and/or treble damages in an enforcement action under CERCLA.

The Agency appreciates your continued cooperation in this final phase of the response actions for this Site. If you have any questions or concerns please contact Rudolph C. Tanasijevich at (404) 562-9557. If your questions are of a technical nature please direct them to Randy Bryant at (404) 562-8938.

Sincerely

A handwritten signature in black ink, appearing to read "Richard D. Green", written over the typed name.

Richard D. Green
Acting Director,
Waste Management Division

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
UNILATERAL ADMINISTRATIVE ORDER
FOR RD/RA

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UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
Region IV

In The Matter Of:

Chevron Chemical Site

Chevron Chemical Company
3100 Orange Blossom Trail
Orange County, Orlando, Florida

)
)
)
) Proceeding Under Section
) 106(a) of the Comprehensive
) Environmental Response,
) Compensation, and Liability
) Act of 1980, as amended by
) the Superfund Amendments and
) Reauthorization Act of 1986
) 42 U.S.C. Section 9606(a)
)
) U.S. EPA Docket No. 97-20-C
)

UNILATERAL ADMINISTRATIVE ORDER
FOR REMEDIAL DESIGN AND REMEDIAL ACTION

I. INTRODUCTION AND JURISDICTION

A. This Unilateral Administrative Order For Remedial Design and Remedial Action (the "Order") directs Respondent to develop the Remedial Design ("RD") for the remedy described in the Record of Decision, dated May 26, 1996, for the Chevron Chemical Company Site, and to implement the Remedial Design by performing the Remedial Action ("RA"), Operation and Maintenance, and Performance Monitoring. This Order is issued to Respondent by the United States Environmental Protection Agency ("EPA") under the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9606(a). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order

12580 (52 Fed. Reg. 2926, January 29, 1987), and was further delegated to EPA Regional Administrators on September 13, 1987, by EPA Delegation No. 14-14-B, and redelegated to the Director, Waste Management Division on January 5, 1989, by Regional Delegation No. 8-14-A, and was further delegated to the Associate Division Director, Waste Management Division, by Regional Delegation No 14-14-B.

II. PARTIES BOUND

A. This Order applies to and shall be binding upon Respondent, its directors, officers, employees, agents, successors, and assigns. Respondent is responsible for carrying out all activities required by this Order. No change in the ownership, corporate status, or other control of any Respondent shall alter the Respondent's responsibilities under this Order.

B. Respondent shall provide a copy of this Order to any prospective owners or successors before a controlling interest in Respondent's property rights, stock, or assets are transferred. Respondent shall provide a copy of this Order to all contractors, sub-contractors, laboratories, and consultants retained to perform any Work under this Order within five (5) days after the effective date of this Order, or on the date such services are retained, whichever date occurs later. Respondent shall also provide a copy of this Order to each person representing any Respondent with respect to the Site or the Work and shall condition all contracts and subcontracts entered into hereunder upon performance of the Work in conformity with the terms of this Order. Notwithstanding the terms of any contract, Respondent is

responsible for ensuring that their contractors and subcontractors and agent perform the Work contemplated herein in accordance with this Order.

C. With regard to the activities undertaken pursuant to this Order, each contractor and subcontractor and agent shall be deemed to be related by contract to the Respondent within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

D. Each Respondent that now or hereafter owns property at the Site shall, within fifteen (15) days after the effective date of this Order or within fifteen (15) days after acquiring title to such property, shall record a copy or copies of this Order in the appropriate office where land ownership and transfer records are filed or recorded, and shall ensure that the recording of this Order is indexed to the titles of each and every property at the Site owned by any Respondent so as to provide notice to third parties of the issuance and terms of this Order with respect to those properties. Respondent shall, within fifteen (15) days after the effective date of this Order or within fifteen (15) days after acquiring title to such property, send notice of such recording and indexing to EPA.

E. Not later than sixty (60) days prior to any transfer of any real property interest in any property included within the Site, Respondent shall submit a true and correct copy of the transfer document(s) to EPA, and shall identify the transferee by name, principal business address, and effective date of the transfer.

III. DEFINITIONS

Unless noted to the contrary, the terms of this Order shall have the meaning assigned to those terms pursuant to CERCLA or any regulation promulgated under CERCLA. Whenever the terms listed below are used in this Order and Appendices attached hereto, the following definitions shall apply:

A. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C.

§ 9601 et seq.

B. "Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or federal holiday. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the end of the next working day.

C. "EPA" shall mean the United States Environmental Protection Agency.

D. "Hazardous Substance" shall mean any substance meeting the definition provided in Section 101(14) of CERCLA, 42 U.S.C.

§ 9601(14).

E. "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, including any amendments thereto.

F. "Operation and Maintenance" or "O&M" shall mean all operation and maintenance activities required by the ROD, the Scope of Work, and the Final Operation and Maintenance Plan developed by

Respondent and approved by EPA pursuant to this Order, including any additional activities required by Sections X (EPA Periodic Review), XI (Additional Response Actions), XII (Endangerment and Emergency Response), and XIII (EPA Review of Submissions).

G. "Paragraph" shall mean a portion of this Order identified by a capital letter.

H. "Parties" shall mean the United States of America and Respondent.

I. "Performance Monitoring" shall mean all performance monitoring activities required by the ROD, the Scope of Work, and the Performance Standards Verification Plan developed by Respondent and approved by EPA, including any additional activities required by Sections X (EPA Periodic Review), XI (Additional Response Actions), XII (Endangerment and Emergency Response), and XIII (EPA Review of Submissions), to ensure the effectiveness of the implemented remedy and to confirm over time that all Performance Standards are met.

J. "Performance Standards" shall mean those cleanup levels, treatment standards, standards of control, and other substantive requirements, criteria or limitations, identified in the ROD and the Scope of Work, and, except for cleanup levels and treatment standards, those identified by EPA during the Remedial Design that the Remedial Action and all other Work required by this Order must attain and maintain.

K. "Pollutant or Contaminant" shall mean any substance defined in Section 101(33) of CERCLA, 42 U.S.C. § 9601(33).

L. "Record of Decision" or "ROD" shall mean the EPA Record of Decision for the Site which was signed on May 22, 1996, by the Acting Director of the Waste Management Division, EPA Region IV, including all attachments thereto. The ROD is attached hereto as Appendix 1 and is incorporated herein by reference.

M. "Remedial Action" or "RA" shall mean those activities, except for Operation and Maintenance, to be undertaken by Respondent to implement the final plans and specifications submitted by Respondent pursuant to the Remedial Design Work Plan approved by EPA, including any additional activities required by Sections XI (EPA Periodic Review), XI (Additional Response Actions), XII (Endangerment and Emergency Response), and XIII (EPA Review of Submissions).

N. "Remedial Design" or "RD" shall mean all studies, investigations or surveys conducted, and plans and specifications prepared, that are necessary to implement the Remedial Action, Operation and Maintenance, and Performance Monitoring activities required by the ROD, the Scope of Work, and the Remedial Design Work Plan developed by Respondent and approved by EPA pursuant to this Order, including any additional activities required by Sections X (EPA Periodic Review), XI (Additional Response Actions), XII (Endangerment and Emergency Response), and XIII (EPA Review of Submissions).

O. "Respondent" shall mean the Chevron Chemical Company.

P. "Section" shall mean a portion of this Order identified by a roman numeral.

Q. "Site" shall mean the Chevron Chemical Company Superfund Site, encompassing approximately 4.39 acres, located at 3100 North Orange Blossom Trail in Orlando, Orange County, Florida, as generally depicted on the map attached hereto as Appendix 3.

Notwithstanding the Site boundaries depicted on Appendix 3, the Site includes all areas to which hazardous substances released at this parcel have migrated and all areas in close proximity to the contamination that are necessary for implementation of the Work.

R. "State" shall mean the State of Florida Department of Environmental Protection.

S. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design, Remedial Action, Operation and Maintenance, and Performance Monitoring at the Site. The SOW is attached hereto as Appendix 2 and is incorporated herein by reference.

T. "United States" shall mean the United States of America, including the Department of Justice and EPA.

U. "Work" shall mean all activities Respondent is required to perform under this Order, including Remedial Design, Remedial Action, Operation and Maintenance, Performance Monitoring, and any schedules or plans required to be submitted pursuant thereto.

IV. FINDINGS OF FACT

The following constitutes an outline of the facts upon which this Order is based:

A. The Chevron Chemical Company Site (Site) is located in the 3100 block of North Orange Blossom Trail (Hwy 441), within Orange County, Orlando Florida. The Site is bordered to the East by

Orange Blossom Trail, to the West by industrial facilities, to the South by railroad tracks, and to the North by a mobile home park. Lake Fairview is located approximately 1,000 feet northwest of the property. The total area of the Site is approximately 5 acres.

B. The Chevron Chemical Company owned and operated the Site as a chemical-blending facility for pesticides and other crop sprays from 1950 to 1976. Chemicals used as carrier solvents in pesticide formulation included xylene, kerosene, mineral oil, mineral spirits and aromatic naphtha. A few of the pesticides formulated in large volumes consisted of chlordane, DDT, BHC-lindane, dieldrin, and aldrin. A rinsate lagoon was used to collect drum rinsate and storm water.

C. In 1978, the Site was purchased "as is" by Mr. Robert R. Uttal, owner and operator of Central Florida Mack Truck Company. Uttal dismantled and sold much of the pesticide formulating and storage equipment and disposed of the remaining inventory and cleaning residues on site. The Site was utilized as a truck sales and service facility until 1987. Waste oil, solvents and motor fuels were stored and spilled or disposed of on Site. Various truck parts, including used oil filters were also disposed of on Site.

D. Central Florida Mack Truck Company went out of business in 1987, with Mr. Uttal retaining ownership of the property.

*Chevron Chemical Company purchased the property from Mr. Uttal in 1994.

E. At the request of Chevron Chemical Company, a consulting firm conducted an investigation to determine the extent of soil and groundwater contamination at the Site. The investigation was conducted in the summers of 1981 and 1982. The final report was issued in January, 1983. Laboratory analysis of on-site groundwater and soil samples indicated that concentrations of arsenic and lindane exceeded primary drinking water standards. Chlordane, DDD-o,p, and DDD-p,p were found in concentrations exceeding EPA guidelines found in Quality Criteria for Water, 1976.

F. In May 1989, the EPA Field Investigation Team conducted a Screening Site Inspection on the Site. During this investigation surface soil, subsurface soil, and groundwater samples were collected. The analytical results for the soil samples indicated the presence of pesticides, benzene, toluene, xylene, chlordane, naphthalene, and metals. In addition, the analytical results for the groundwater samples indicated the presence of metals, benzene, toluene, xylene, pesticides, trichlorethylene and chlorobenzene.

G. In September 1990, Brown and Caldwell Consultants conducted a Contamination Assessment Report on the Site. During this investigation surface soil, subsurface soil, and groundwater samples were collected. The results of the soil sampling indicated the presence of chlordane, xylene, dieldrin, aldrin, endrin, heptachlor, ethion, and arsenic. Groundwater samples indicated the presence of benzene, toluene, xylene, chlorobenzene, BHC isomers, aldrin, dieldrin, and heptachlor.

H. The analytical data presented is consistent with the general historical information regarding the former pesticide blending and the truck servicing facility.

I. The Site lies in the Atlantic Coastal Plain Physiographic Province in Central Florida. The Orlando area lies in the highland region which is an area of karst terrain, characterized by hummocky, undulating topography along with numerous lakes, and depressions. The geology of the site and region is characterized by a shallow (30 feet) layer of loose porous sand, a thick (0-200 feet) layer of clay, sand and phosphatic limestone (Hawthorne Formation) and underlying deposits of limestone and anhydrite to about 6500 feet below land surface (BLS).

J. The groundwater regime at the site consists of an unconfined surficial aquifer, extending from around 6 feet to a depth of approximately 30 feet, flowing in a north-easterly direction at an estimated rate of 12 feet per year. The surficial aquifer has been classified by EPA as a Class II aquifer, or a potential source of drinking water. The State of Florida classified the surficial aquifer as Class G-II, for potable water usage. The Hawthorne Formation, which begins at 30 feet, is a clay layer which serves as the confining unit between the surficial aquifer and the deeper and more extensive Floridan aquifer.

K. The Floridan aquifer is highly permeable and extensive in the area. The aquifer is considered to be semi-confined. It is the principle potable water producing zone for Orange County. The Floridan aquifer is primarily composed of limestone and is estimated to be between 1,500 and 2,000 feet thick. The top of

the Floridan aquifer is approximately 130 to 150 feet deep in the vicinity of the site.

L. The nature of release of contaminants has been identified as contaminated soils leading to the release of contaminants to the groundwater through downward migration. The groundwater is the primary migration pathway of concern due to the extent of the contaminant plume.

M. Groundwater is the major pathway of concern. Two municipal systems operate wells located within a 4-mile radius of the Site. Private wells within a 4-mile radius serve an estimated 1470 persons. Given, however, the presence of a municipal drinking water system in the area of the Site, there are no known drinking water wells in the vicinity of the groundwater plume. The nearest well that could potentially be used for drinking water is about 3/4 of a mile northwest of the Site.

N. On May 15, 1990, an Administrative Order on Consent, EPA Docket No. 90-37-C, was executed between the EPA, Robert R. Uttal and Chevron Chemical Company for the performance of a CERCLA removal action at the Site. Chevron prepared and submitted a Removal Action Plan, which incorporated Site clearance, soil removal, Site dewatering, treatment, and disposal of treated water to an infiltration gallery onsite. The plan was approved by the EPA. The AOC was conducted in accordance with the National Contingency Plan but did not address the long-term remediation of the groundwater at the Site.

O. On April, 11 1991, the Agency for Toxic Substances and Disease Registry (ATSDR) established soil cleanup levels for the

site based on chlordane as the indicator chemical of most concern to human health:

50 mg/kg in shallow soils and 100 mg/kg in deeper soils.

P. The Removal Action commenced in December 1991, and continued through September 1992. An EPA On Scene Coordinator or TAT was on site during all demolition, construction, excavation and shipping activity. Structures, including an office building, remnants of a burned warehouse and a large water tower, were demolished and removed from the site. During the excavation, a floating non-aqueous phase liquid (NAPL) consisting of weathered gasoline and diesel, was removed from the surface of the groundwater in the area formerly occupied by the rinsate lagoons. Groundwater infiltration and decontamination water was collected from the excavation and treated to meet Federal and State ARARs.

Q. Approximately 17,650 tons of non-hazardous, pesticide/petroleum cross contaminated soil was removed to Chemical Waste Management's Class I hazardous waste landfill in Carlyss, Louisiana and 4500 tons of non-hazardous petroleum contaminated soils were sent to C. A. Meyer Paving in Clermont, Florida for thermal treatment and recycling into soil cement and asphalt. Approximately 131 tons of listed hazardous waste (originating from an ethyl parathion spill and disposal of drums containing chlordane) was shipped to Rollins Environmental Services in Deer Park, Texas for incineration.

R. Groundwater samples taken prior to the removal action detected benzene, chlorobenzene, dichlorobenzenes, ethylbenzene, xylene, toluene and BHC isomers downgradient of the site.

S. The site is presently secured and unoccupied. All structures and debris have been removed and over 50% of the surface area contains imported clean fill to a minimum depth of 1 foot.

T. On May 13, 1994, (59 Fed. Reg. 27989), pursuant to section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B.

U. In response to a release or substantial threat of release of hazardous substances at or from the Site, Chevron commenced on April 14, 1993, a Remedial Investigation and Feasibility Study ("RI/FS") for the Site pursuant to CERCLA and the National Contingency Plan, 40 C.F.R. § 300.430.

V. The Remedial Investigation ("RI") Report was completed on November 12, 1994, and the Feasibility Study ("FS") Report was completed on February 9, 1995.

W. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the completion of the FS and of the proposed plan for remedial action on July 18, 1995, in a major local newspaper of general circulation and provided opportunity for public comment on the proposed remedial action.

X. The decision by EPA on the remedial action to be implemented at the Site is embodied in a Record of Decision ("ROD"), executed on May 22, 1996, on which the State had an opportunity to comment. The ROD includes a responsiveness summary to the public comments. The ROD is supported by an administrative record that contains the documents and information upon which EPA based the selection of the response action. The administrative record is

available for public review at EPA's regional office in Atlanta, Georgia and at the Edgewater Branch Public Library.

Y. The results of the RI confirmed that the contaminants of concern in the soil were pesticides, including chlordane, and Volatile Organic Compounds, including xylene. The contaminants of concern in the groundwater as supported by the RI, were VOCs, pesticides, and metals. The RI results also showed that the groundwater contamination concentrations are relatively low and the concentrations of the VOCs generally show an overall decline. The contaminant plume appears to have reached steady state conditions and is apparently limited to the surficial aquifer.

Z. The population that is at risk includes any future residents of the Site itself, and any future users of the groundwater at the Site and immediately down gradient. The current land use around the Site is a mix of commercial and residential.

Commercial properties are located on three sides of the property. Residential property consisting of two trailer parks is located just north of the Site. According to the Orange County Planning Department, future land use on all sides of the Site is projected to be industrial/commercial.

AA. The contaminated soils from the Site were removed prior to issuance of the ROD. The major components of the remedy selected in the ROD address the groundwater and include: natural attenuation; groundwater monitoring to document achievement of the groundwater clean-up levels; and a contingency plan that includes the installation of a subsurface filter wall if natural attenuation does not continue as anticipated. Air stripping,

hydraulic gradient control, or source removal will be implemented if necessary.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

A. The Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

B. Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

C. The Respondent is a "liable party" as defined in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), based on its ownership and operation of the Site.

D. The contaminants found at the Site include "hazardous substances" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

E. These hazardous substances have been released from the Site into the soil and groundwater at the Site.

F. The disposal and migration of hazardous substances into the soil and groundwater at and/or from the Site constitute a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

G. The potential for future migration of hazardous substances at and/or from the Site poses a threat of a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

H. The actual and threatened release of one or more hazardous substances from the Site present an imminent and substantial endangerment to the public health or welfare or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

I. The actions required by this Order are necessary to protect the public health, welfare, and the environment and are not inconsistent with the NCP and CERCLA.

VI. NOTICE TO THE STATE

A. On May 29, 1997, prior to issuing this Order, EPA notified the State of Florida, as represented by the Florida Department of Environmental Protection that EPA would be issuing this Order.

VII. ORDER

Based on the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, EPA hereby orders that Respondent comply with the terms of this Administrative Order, including but not limited to, all Appendices to this Order, all documents incorporated by reference into or to be developed pursuant to this Order, and all schedules and deadlines in this Order, attached to this Order, incorporated by reference into this Order, or to be developed pursuant to this Order, and perform the following actions.

VIII. WORK TO BE PERFORMED

A. Appendix 2 to this Order is the SOW which sets forth the major tasks that must be completed by Respondent to implement the Work at the Site. The SOW is incorporated into this Order by reference as if fully set forth herein and is therefore both a requirement and an enforceable part of this Order.

B. Respondent shall cooperate with EPA in providing information regarding the Work to the public. As requested by EPA, Respondent shall participate in the preparation of such information for distribution to the public and in public meetings

which may be held or sponsored by EPA to explain activities at or relating to the Site.

C. All aspects of the Work to be performed by Respondent pursuant to this Order shall be under the direction and supervision of a qualified contractor ("Supervising Contractor") who shall be a qualified professional engineer or geologist with expertise in hazardous waste cleanups, the selection of which shall be subject to disapproval by EPA. Within ten (10) days after the effective date of this Order, Respondent shall submit to EPA in writing the name, title, and qualifications of any contractor proposed to be the Supervising Contractor, including primary support entities and staff. EPA will issue a notice of disapproval or an authorization to proceed.

D. If EPA disapproves a proposed Supervising Contractor, Respondent shall submit to EPA within fifteen (15) calendar days after receipt of EPA's disapproval of the Supervising Contractor previously proposed, a list of contractors, including primary support entities and staff, that would be acceptable to Respondent. EPA shall, after receipt of the list, provide written notice of the names of the contractors it disapproves and an authorization to proceed with respect to any of the other contractors. Respondent may select any contractor from that list that is not disapproved and shall notify EPA of the name of the Supervising Contractor selected within ten (10) days of EPA's authorization to proceed.

E. If at any time thereafter, Respondent proposes to use a different Supervising Contractor for Work at the Site, Respondent

shall notify EPA and shall obtain an authorization to proceed from EPA before a new Supervising Contractor performs any Work under this Order. Any change in the Supervising Contractor made pursuant to this paragraph, shall not excuse any Work, deadlines, or schedules required under this Order.

F. The purpose of the Remedial Design/Remedial Action is to design, construct, operate and maintain, and monitor the performance of the selected remedy to ensure protection of human health and the environment. The Remedial Design (discussed in Paragraph G, below) includes those activities to be undertaken by Respondent to develop the final plans and specifications, general provisions, and special requirements necessary to translate the ROD into the remedy to be constructed during the Remedial Action phase (discussed in more detail in Paragraph H, below). The Remedial Action involves the implementation phase of Site cleanup or actual construction of the remedy. The Remedial Action is based on the Remedial Design to achieve the Performance Standards at the Site. The major tasks that Respondent must complete and the deliverables associated with each task to support the Work are described in the SOW. EPA approval of a task or deliverable shall not be construed as a guarantee of the ultimate adequacy of such a task or deliverable.

G. Remedial Design -

1. Within 45 days after EPA's issuance of an authorization to proceed pursuant to Paragraph C or D above, Respondent shall submit to EPA and the State a work plan, as noted in the attached SOW, for the design of the Remedial Action

at the Site ("Remedial Design Work Plan"). The Remedial Design Work Plan, and the other deliverables submitted pursuant to or in conjunction with the Remedial Design Work Plan, shall provide for design of the remedy set forth in the ROD in accordance with the SOW and, upon their approval by EPA, shall be incorporated into and become enforceable under this Order. Within 45 days after EPA's issuance of an authorization to proceed, Respondent shall also submit to EPA and the State a Health and Safety Plan for field design activities which conforms to the applicable Occupational Safety and Health Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

2. The Remedial Design Work Plan shall include plans and schedules for implementation of all remedial design and pre-design tasks identified in the SOW, and shall be developed in conjunction with other deliverables identified in the SOW, including, but not limited to, the following items: (1) a Sampling and Analysis Plan (including, but not limited to, a Quality Assurance Project Plan (QAPP) in accordance with Section XV (Quality Assurance, Sampling and Data Analysis)); (2) a Treatability Study Work Plan; (3) a preliminary design submittal; (4) a draft design submittal; and (5) a pre-final/final design submittal. In addition, the Remedial Design Work Plan shall include a schedule for completion of the Remedial Action Work Plan.

3. Upon approval of the Remedial Design Work Plan and the Sampling and Analysis Plan, and the Treatability Study Work Plan, by EPA, after a reasonable opportunity for review and

comment by the State, and submittal to EPA and the State of the Health and Safety Plan for all field activities, Respondent shall implement the Remedial Design Work Plan. Respondent shall submit to EPA and the State all plans, submittals and other deliverables required under the approved Remedial Design Work Plan in accordance with the approved schedule for review and approval pursuant to Section XIII (EPA Review of Submissions). Unless otherwise directed by EPA, Respondent shall not commence further Remedial Design activities at the Site prior to approval of the Remedial Design Work Plan and the Sampling and Analysis Plan, and the Treatability Study Work Plan.

4. The draft design submittal, shall be a continuation and expansion of the preliminary design and shall include, at a minimum, the following: (1) results of data acquisition activities; (2) design criteria report; (3) a plan for satisfying permitting requirements; (4) a treatability study final report; (5) a draft design analyses; (6) draft plans and specifications; (7) a draft construction schedule; and (8) a Performance Standards Verification Plan. Any value engineering proposals must be identified and evaluated during this review.

5. The pre-final/final design submittal shall include, at a minimum, the following: (1) complete design analyses; (2) final plans and specifications; (3) final construction schedule; (4) a construction cost estimate; and (5) an Operation and Maintenance Plan.

H. Remedial Action -

1. Concurrent with the submittal of the pre-final/final design, Respondent shall submit to EPA and the State, a work plan for the performance of the Remedial Action at the Site ("Remedial Action Work Plan"). The Remedial Action Work Plan, and the other deliverables submitted pursuant to or in conjunction with the Remedial Action Work Plan, shall provide for construction of the remedy, in accordance with the SOW, as set forth in the design plans and specifications in the approved final design submittal and, upon their approval by EPA, shall be incorporated into and become enforceable under this Order. At the same time as they submit the Remedial Action Work Plan, Respondent shall submit to EPA and the State a Construction Health and Safety Plan/Contingency Plan for field activities required by the Remedial Action Work Plan which conforms to the applicable Occupational Safety and Health Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

2. The Remedial Action Work Plan shall include plans and schedules for implementation of all remedial action tasks identified on the SOW, and shall be developed in conjunction with other deliverables identified in the SOW, including, but not limited to, the following items: (1) the schedule for completion of the Remedial Action; (2) schedule for developing and submitting other required Remedial Action plans; (3) a Project Delivery Strategy; (4) a Construction Management Plan; and (5) a Construction Quality Assurance Plan.

3. Upon approval of the Remedial Action Work Plan, and the other deliverables to be developed in conjunction with the Remedial Action Work Plan as set forth in the SOW, by EPA, after a reasonable opportunity for review and comment by the State, Respondent shall implement the activities required under the Remedial Action Work Plan. Respondent shall submit to EPA and the State all plans, submittals, or other deliverables required under the approved Remedial Action Work Plan in accordance with the approved schedule for review and approval pursuant to Section XIII (EPA Review of Submissions). Unless otherwise directed by EPA, Respondent shall not commence physical on-site activities at the Site prior to approval of the Remedial Action Work Plan and such other deliverables to be developed in conjunction with the Remedial Action Work Plan as set forth in the SOW.

4. Within ten (10) days after EPA approves the RA Work Plan, Respondent shall notify EPA in writing of the name, title, and qualifications of the construction contractor proposed to be used in carrying out the Work under this Order. If at any time Respondent proposes to change the construction contractor, Respondent shall notify EPA immediately and shall obtain approval from EPA, as provided in this paragraph, before the new construction contractor performs any of the Work under this Order. If EPA disapproves of the selection of any contractor as the construction contractor, Respondent shall submit a list of contractors that would be acceptable to Respondent to EPA within fifteen (15) days after receipt of EPA's disapproval of the contractor previously selected. EPA will thereafter provide

written notice of the names of the contractors it approves, if any. Respondent may select any approved contractor from that notice and shall notify EPA of the name of the contractor elected within ten (10) days of EPA's designation of approved contractors.

I. Operation and Maintenance and Performance Monitoring - The Operation and Maintenance Plan shall be developed and submitted to EPA for review and approval in accordance with the SOW. Respondent shall also develop and submit the Performance Standards Verification Plan to EPA for review and approval in accordance with the SOW. Upon approval by EPA, Respondent shall implement the Operation and Maintenance Plan and the Performance Standards Verification Plan.

J. Performance Standards - The Work performed by Respondent pursuant to this Order shall, at a minimum, achieve the Performance Standards.

K. Warranties - Notwithstanding any action by EPA, Respondent remain fully responsible for achievement of the Performance Standards. Nothing in this Order, or in EPA's approval of the Remedial Design or Remedial Action Work Plans, or approval of any other submission, shall be deemed to constitute a warranty or representation of any kind by EPA that full performance of the Remedial Design or Remedial Action will achieve the Performance Standards. Respondent's compliance with such approved documents does not foreclose EPA from seeking additional work to achieve the applicable Performance Standards.

L. Notification of Off-Site Waste Shipment - All materials removed from the Site shall be disposed of or treated at a facility approved by the EPA Project Coordinator and in accordance with Section 121(d)(3) of CERCLA, 42 U.S.C. 9621(d)(3), with the U.S. EPA "Off-Site Policy," 40 C.F.R. § 300.440 (50 Fed. Reg. 49200, September 22, 1993), and with all other applicable Federal, State and local requirements. Respondent shall, prior to any off-Site shipment of hazardous substances from the Site to an off-Site waste management facility, provide written notification to the appropriate state environmental official in the receiving state and to the EPA Project Coordinator, of such shipment of hazardous substances. However, the notification of shipments shall not apply to any off-Site shipments when the total volume of all shipments from the Site to the State will not exceed ten (10) cubic yards.

1. The notification shall be in writing, and shall include the following information, where available: (a) the name and location of the facility to which the hazardous substances are to be shipped; (b) the type and quantity of the hazardous substances to be shipped; (c) the expected schedule for the shipment of the hazardous substances; and (d) the method of transportation. Respondent shall notify the receiving state of major changes in the shipment plan, such as a decision to ship the hazardous substances to another facility within the same state, or to a facility in another state.

2. The identity of the receiving facility and state will be determined by Respondent following the award of the contract for

Remedial Action construction. Respondent shall provide all relevant information on the off-site shipments as soon as practicable after the award of the contract and before the hazardous substances are actually shipped.

3. The contents of this provision shall not be considered to be approval of the off-Site shipment of materials from the Site where the ROD requires treatment and/or storage on-Site.

IX. CERTIFICATION OF COMPLETION

A. Within thirty (30) days after Respondent concludes that the Remedial Action has been fully performed, and that the Performance Standards have been attained, Respondent shall so notify EPA and shall schedule and conduct a pre-certification inspection to be attended by Respondent and EPA. The pre-certification inspection shall be followed by a written Remedial Action Report submitted within thirty (30) days of the inspection by a registered professional engineer and Respondent's(') Project Coordinator certifying that the Remedial Action has been completed in full satisfaction of the requirements of this Order. If, after completion of the pre-certification inspection and receipt and review of the Remedial Action Report, EPA determines that the Remedial Action or any portion thereof has not been completed in accordance with the Order, EPA shall notify Respondent in writing of the activities that must be undertaken to complete the Remedial Action and shall set forth in the notice a schedule for performance of such activities. Respondent shall perform all activities described in the notice in accordance with the specifications and schedules established therein. If EPA

concludes, following the initial or any subsequent certification of completion by Respondent that the Remedial Action has been fully performed in accordance with this Order, EPA may notify Respondent that the Remedial Action has been fully performed. EPA's notification shall be based on present knowledge and Respondent's certification to EPA, and shall not limit EPA's right to perform periodic reviews pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), or to take or require any action that in the judgment of EPA is appropriate at the Site, in accordance with 42 U.S.C. §§ 9604, 9606, or 9607.

B. Within thirty (30) days after Respondent concludes that all phases of the Work have been fully performed, Respondent shall submit to EPA a written report, by a registered professional engineer, certifying that the Work has been completed in full satisfaction of the requirements of this Order. EPA shall require such additional activities as may be necessary to complete the Work, or EPA may, based upon present knowledge and Respondent's certification to EPA, issue written notification to Respondent that the Work has been completed. EPA's notification shall not limit EPA's right to perform periodic reviews pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), or to take or require any action that in the judgment of EPA is appropriate at the Site, in accordance with 42 U.S.C. §§ 9604, 9606 or 9607.

X. EPA PERIODIC REVIEW

Under Section 121(c) of CERCLA, 42 U.S.C. §9621(c), and any applicable regulations, EPA may review the Site to assure that the Work performed pursuant to this Order adequately protects

human health and the environment. Respondent shall conduct the requisite studies, investigations, or other response actions as determined necessary by EPA in order to permit EPA to conduct the review under Section 121(c) of CERCLA. As a result of any review performed under this paragraph, Respondent may be required to perform additional response actions or to modify the Work previously performed.

XI. ADDITIONAL RESPONSE ACTIONS

A. EPA may determine that, in addition to the Work identified in this Order and attachments to this Order, additional response actions may be necessary to meet the Performance Standards or to protect human health and the environment. If EPA determines that additional response actions are necessary, EPA will notify Respondent and may require Respondent to submit a work plan for such additional response actions. EPA may also require Respondent to modify any plan, design, or other deliverable required by this Order, including any approved modifications. Respondent shall notify EPA of their intent to perform such additional response actions within seven (7) days after receipt of EPA's request for additional response actions.

B. Unless otherwise stated by EPA, not later than thirty (30) days after receiving EPA's notice that additional response actions are required pursuant to this Section, Respondent shall submit a work plan for the additional response actions ("Additional Response Action Plan") to EPA for review and approval. The plan shall conform to the applicable requirements of Sections VIII (Work to be Performed), XV (Quality Assurance

Sampling and Data Analysis), and XVI (Compliance with Applicable Laws) as appropriate. Upon approval by EPA, the Additional Response Action Plan shall be incorporated into this Order as a requirement of this Order and shall be an enforceable part of this Order as if fully set forth herein. Upon approval of the Additional Response Action Plan pursuant to the procedures set forth in Section XIII (EPA Review of Submissions), Respondent shall implement the Additional Response Action Plan according to the standards, specifications, and schedule in the approved Additional Response Action Plan.

XII. ENDANGERMENT AND EMERGENCY RESPONSE

A. In the event of any action or occurrence after the effective date of this Order which causes or threatens a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action to prevent, abate, or minimize such release or endangerment, and shall immediately notify EPA's Project Coordinator, or, if the Project Coordinator is unavailable, EPA's alternative Project Coordinator. If neither of these persons is available, Respondent shall notify the EPA Region IV Hotline at (404) 562-8700. Respondent shall take such action in consultation with EPA's Project Coordinator and in accordance with all applicable provisions of this Order, including, but not limited to, the Health and Safety/Contingency Plans developed pursuant to the SOW. In the event that Respondent fail to take appropriate response action as required by this Section, and EPA takes that action instead, EPA reserves

the right to pursue reimbursement of all EPA's costs attributable to the response action that are not inconsistent with the NCP.

B. Nothing in the preceding paragraph shall be deemed to limit any authority of the United States to take, direct, or order any appropriate action necessary to protect human health and the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances on, at, or from the Site.

XIII. EPA REVIEW OF SUBMISSIONS

A. Upon receipt of any plan, report, or other item which is required to be submitted for approval pursuant to this Order, EPA shall, in writing, either: (1) approve the submission; or (2) disapprove the submission, notifying Respondent of deficiencies. If such submission is disapproved, EPA shall either: (1) notify Respondent that EPA will assume the responsibility for modifying the submission to correct the deficiencies, including, if necessary, the underlying Work; or (2) direct Respondent to modify the submission and, if necessary, the underlying Work, to correct the deficiencies.

B. In the event of approval or modification by EPA, Respondent shall proceed to take any action required by the plan, report, or other item, as approved or modified.

C. Upon receipt of a written notice of disapproval and directive for modification, Respondent shall, within thirty (30) days or such other time as specified by EPA in its notice of disapproval or request for modification, correct the deficiencies and resubmit the plan, report, or other item for approval.

Notwithstanding the notice of disapproval, Respondent shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission.

D. If, upon resubmission, the plan, report, or item is not approved, Respondent shall be deemed to be in violation of this Order.

E. The provisions of this Order shall govern all proceedings regarding the Work performed pursuant to this Order. In the event of any inconsistency between this Order and any required deliverable submitted by Respondent, the inconsistency will be resolved in favor of this Order.

XIV. PROGRESS REPORTS

A. In addition to the deliverables set forth in this Order, Respondent shall submit written monthly progress reports to EPA with respect to actions and activities undertaken pursuant to this Order. The progress reports shall be submitted on or before the 5th day of each month beginning thirty (30) days following the effective date of this Order. Respondent's obligation to submit progress reports continues until EPA gives Respondent written notice that Respondent has demonstrated, to EPA's satisfaction, that all of the terms of this Order, including any additional tasks which EPA has determined to be necessary, have been completed. In addition, EPA may request periodic briefings by Respondent to discuss the progress of the Work.

B. At a minimum, these progress reports shall: (1) describe the actions which have been taken to comply with this Order during the prior month; (2) include all results of sampling and tests

and all other data received by Respondent and not previously submitted to EPA; (3) include all plans, reports, deliverables, and procedures completed under the work plans during the previous month; (4) describe all work planned for the next month with schedules relating such work to the overall project schedule for RA completion; and (5) describe all problems encountered and any anticipated problems, any actual or anticipated delays, and solutions developed and implemented to mitigate or address any actual or anticipated problems or delays.

C. Upon the occurrence of any event during performance of the Work or additional response actions which, pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, requires reporting to the National Response Center, Respondent shall promptly orally notify the EPA Project Coordinator, or in the event of the unavailability of the EPA Project Coordinator, the EPA Region IV Hotline at (404) 562-8700, in addition to the reporting required by Section 103 of CERCLA, 42 U.S.C. § 9603. Within ten (10) days of the onset of such an event, Respondent shall furnish to the EPA a written report setting forth the events which occurred and the measures taken, and to be taken, in response thereto. Within thirty (30) days of the conclusion of such an event, Respondent shall submit a report setting forth all actions taken.

D. Respondent shall submit each year, within thirty (30) days of the anniversary of the effective date of this Order, a summary report to EPA setting forth the status of the Work which shall at a minimum include a statement of tasks accomplished in the preceding year, a statement of tasks remaining to be

accomplished, and provide a schedule for implementation of the remaining Work.

XV. QUALITY ASSURANCE SAMPLING AND DATA ANALYSIS

A. Respondent shall use the quality assurance, quality control, and chain of custody procedures in accordance with EPA's "Interim Guidelines and Specifications For Preparing Quality Assurance Project Plan" (QAMS-005/80) and the "EPA Region IV, Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual" (U.S. EPA Region IV, Environmental Services Division, May, 1996), and subsequent amendments to such guidelines, while conducting all sample collection and analysis activities required herein by any plan. Prior to the commencement of any monitoring project under this Order, Respondent shall submit for approval by EPA a Quality Assurance Project Plan ("QAPP") that is consistent with applicable guidelines. Respondent shall assure that EPA personnel or authorized representatives are allowed access to any laboratory utilized by Respondent in implementing this Order.

B. Respondent shall make available to EPA the results of all sampling and/or tests or other data generated by Respondent with respect to the implementation of this Order, and shall submit these results in monthly progress reports as described in Section XIV (Progress Reports) of this Order.

C. At the request of EPA, Respondent shall allow split or duplicate samples to be taken by EPA, and/or their authorized representatives, of any samples collected by Respondent pursuant to the implementation of this Order. Respondent shall notify EPA

not less than fourteen (14) days in advance of any sample collection activity. In addition, EPA shall have the right to take any additional samples that EPA deems necessary.

D. Respondent shall ensure that the laboratories utilized by Respondent for analyses participate in an EPA quality assurance/quality control program equivalent to that which is followed by EPA and which is consistent with EPA document QAMS-005/80. In addition, EPA may require Respondent to submit data packages equivalent to those generated in the EPA Contract Laboratory Program (CLP) and may require laboratory analysis by Respondent of performance samples (blank and/or spike samples) in sufficient number to determine the capabilities of the laboratory.

E. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA, the Solid Waste Disposal Act (SWDA), 42 U.S.C. §§ 6901 et seq., and any other applicable statutes or regulations.

XVI. COMPLIANCE WITH APPLICABLE LAWS

A. All actions by Respondent pursuant to this Order shall be performed in accordance with the requirements of all applicable or relevant and appropriate laws, as required by CERCLA and the NCP. The United States has determined that the activities contemplated by this Order are consistent with the NCP.

*B. Except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and the NCP, no permit shall be required for any portion of the Work conducted entirely on the Site. Where any

portion of the Work requires a federal or state permit or approval under CERCLA and the NCP, Respondent shall submit on a timely basis applications and take all other actions necessary to obtain all such permits or approvals.

C. This Order is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

D. Respondent shall include in all contracts or subcontracts entered into for Work required under this Order provisions stating that such contractors or subcontractors, including their agents and employees, shall perform all activities required by such contracts or subcontracts in compliance with all applicable laws and regulations. Respondent shall provide a certification to the United States that such provision has been included in its contracts and subcontracts, within fifteen (15) days of final execution of contracts for Remedial Design, Remedial Action, Operation and Maintenance, and Performance Monitoring work.

XVII. PROJECT COORDINATOR

A. Within fifteen (15) days after the effective date of this Order, Respondent shall designate a Project Coordinator and shall submit the name, address, and telephone number of the Project Coordinator to EPA. Respondent's Project Coordinator shall be responsible for overseeing the implementation of this Order. If Respondent wishes to change their Project Coordinator, Respondent shall provide written notice to EPA, five (5) days prior to changing the Project Coordinator, of the name and qualifications of the new Project Coordinator.

B. All communications, whether written or oral, from Respondent to EPA shall be directed to EPA's Project Coordinator or Alternate Project Coordinator who shall be a Remedial Project Manager (RPM) or On-Scene Coordinator (OSC). EPA's Project Coordinator is:

Randy Bryant
Remedial Project Manager
United States Environmental Protection Agency
61 Forsyth Street
Atlanta, Georgia 30303
(404) 562-8938

EPA's Alternate Project Coordinator is:

Jim McGuire, Chief
South Florida Section
South Superfund Remedial Branch
United States Environmental Protection Agency
61 Forsyth Street,
Atlanta, Georgia 30303
(404) 562-8911

C. EPA has the unreviewable right to change its Project Coordinator or Alternate Project Coordinator. If EPA changes its Project Coordinator or Alternate Project Coordinator, EPA will inform Respondent in writing of the name, address, and telephone number of the new Project Coordinator or Alternate Project Coordinator.

D. EPA's Project Coordinator and Alternative Project Coordinator shall have the authority lawfully vested in a RPM and OSC by the National Contingency Plan, 40 C.F.R. Part 300. In addition, EPA's Project Coordinator or Alternative Project Coordinator shall have authority, consistent with the National Contingency Plan, to halt any work required by this Order and to take any necessary response action.

E. The absence of the EPA Project Coordinator from the Site shall not be cause for stoppage or delay of Work.

XVIII. SITE ACCESS

A. At all reasonable times from the effective date of this Order until EPA provides written notification that the Work has been completed pursuant to Section IX (Certification of Completion) of this Order, EPA and its authorized representatives and contractors shall have the authority to enter and freely move about all property at the Site and off-Site areas to which access is required to implement this Order, including areas subject to or affected by the cleanup or where documents required to be prepared or maintained by this Order are located, to the extent access to the property is controlled by or available to Respondent. Access shall be allowed for the purposes of conducting any activity authorized by or related to this Order, including but not limited to: 1) inspecting conditions, activities, the results of activities, records, operating logs, and contracts related to the Site or Respondent and its representatives or contractor pursuant to this Order; 2) reviewing the progress of Respondent in carrying out the terms of this Order; 3) conducting tests or inspections as EPA or its authorized representatives or contractors deem necessary to verify data or information submitted to EPA, take samples or investigate contamination at or near the Site; 4) assess the need for planning and implementing additional remedial or response activities at or near the Site; or 5) using a camera, sound recording device or other documentary-type equipment.

XIX. ACCESS TO SITE NOT OWNED BY RESPONDENTS

A. If the Site, or the off-Site area that is to be used for access, or other property subject to or affected by the cleanup or where documents required to be prepared or maintained by this Order are located, is controlled or owned in whole or in part by parties other than Respondent, Respondent will obtain, or use their best efforts to obtain, access agreements from such parties within thirty (30) days of the effective date of this Order.

Such agreements shall provide access for EPA, its contractors and oversight officials, the State and its contractors, and Respondent or Respondent's authorized representatives and contractors, and such agreements shall specify that Respondent is not EPA's representative with respect to liability associated with Site activities. Copies of such agreements shall be provided to EPA prior to Respondent's initiation of field activities. Respondent's best efforts shall include providing reasonable compensation to any off-Site property owner.

B. If access agreements are not obtained within the time referenced above, Respondent shall immediately notify EPA in writing of its failure to obtain access. EPA may use its legal authorities to obtain access for Respondent, may perform those tasks or activities requiring access with EPA contractors, or may terminate the Order if Respondent cannot obtain access agreements. If EPA performs those tasks or activities requiring access with EPA contractors and does not terminate the Order, Respondent shall perform all other activities not requiring such access, and shall be liable to EPA for reimbursement of all

costs, including attorney fees, incurred in performing such activities. Respondent shall integrate the results of any such tasks undertaken by EPA into their reports and deliverables. EPA reserves the right to seek cost recovery for all costs and attorney fees incurred by the United States to obtain access for Respondent.

C. Notwithstanding any provision of this Order, the United States retains all of its access authorities and rights under CERCLA and any other applicable statutes or regulations.

XX. ACCESS TO INFORMATION AND DATA/DOCUMENT AVAILABILITY

A. Respondent shall provide to EPA and its authorized representatives, upon request, access to inspect and/or copy all documents and information in its possession and/or control or that of its contractors or agents relating to activities at the Site or to the implementation of this Order, including all files, records, documents, photographs, sampling and analysis records, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information relating to remedial activities and other Work required under the Order.

B. Respondent may assert a claim of business confidentiality covering part or all of the information submitted to EPA pursuant to the terms of this Order under 40 C.F.R. § 2.203, to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7). This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b) and shall be substantiated by Respondent at the time the assertion is made.

Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2. If no claim of confidentiality accompanies specific documents or information when they are submitted to EPA, or if EPA has notified the Respondent that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA and 40 C.F.R. § 2.203(b), the public may be given access to such documents or information by EPA or the State without further notice to Respondent.

C. Respondent shall not assert confidentiality claims with respect to any data related to Site conditions, sampling, or monitoring.

D. Respondent shall maintain, for the period during which this Order is in effect, an index of documents that Respondent claims contain privileged information or confidential business information. The index shall contain, for each document, the date, author, addressee, and subject of the document. Upon written request from EPA, Respondent shall submit a copy of the index to EPA.

XXI. RECORD PRESERVATION

A. Respondent shall provide to EPA, upon request, copies of all documents and information within, or which come within, their possession and/or control or the control of their contractors or agents relating to activities at the Site or to the implementation of this Order, including but not limited to sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence,

or other documents or information related to the Work.

Respondent shall also make available to EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

B. Until EPA provides written notification that the Work has been completed pursuant to Section IX (Certification of Completion), Respondent shall preserve and retain, and shall instruct its contractors and agents to preserve and retain, all documents, records, and information of whatever kind, nature, or description relating to the performance of the Work.

C. All records and documents in Respondent's possession at any time prior to termination of this Order, that relate in any way to the Site shall be preserved and retained by Respondent for a minimum of ten (10) years after EPA provides written notification, pursuant to Section IX (Certification of Completion) of this Order, that the Work has been completed. Respondent shall acquire and retain copies of all documents that relate to the Site and that are in the possession of their employees, agents, accountants, contractors, or attorneys. After this ten (10)-year period, Respondent shall notify EPA at least ninety (90) days before the documents are scheduled to be destroyed and, upon request of EPA, shall deliver said records or documents to EPA at no cost.

D. EPA has the discretion to request that all records and documents be retained for a longer period of time by Respondent.

E. Within 45 days after the effective date of this Order, Respondent shall submit a written certification to EPA's Project Coordinator that they have not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information relating to their potential liability with regard to the Site since notification of potential liability by the United States or the State or the filing of suit against it regarding the Site. Respondent shall not dispose of any such documents without prior approval by EPA. Respondent shall, upon EPA's request and at no cost to EPA, deliver the documents or copies of the documents to EPA.

XXII. DELAY IN PERFORMANCE

A. Any delay in performance of this Order that, in EPA's judgment, is not properly justified by Respondent under the terms of this paragraph shall be considered a violation of this Order. No delay in performance of this Order shall affect Respondent's obligations to fully perform all obligations under the terms and conditions of this Order.

B. Respondent shall notify EPA of any delay or anticipated delay in achieving compliance with any requirement of this Order. Such notification shall be made by telephone to EPA's Project Coordinator or Alternate Project Coordinator within 48 hours after Respondent first knew or should have known that an event might cause a delay. Respondent shall adopt all reasonable measures to avoid or minimize any such delay. Within five (5) business days after notifying EPA by telephone, Respondent shall provide written notification fully describing the nature of the

delay, the reasons the delay is beyond the control of Respondent, any defenses under Section 106(b)(1), 42 U.S.C. § 9606(b)(1), available to Respondent for failing to comply with any relevant requirements of this Order, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that will be taken to mitigate the effect of the delay.

Financial inability to perform the Work, increased costs or expenses associated with implementation of the activities required by this Order, or failure to attain the Performance Standards shall not be considered circumstances beyond the control of Respondent.

XXIII. REIMBURSEMENT OF RESPONSE COSTS

A. EPA reserves the right to demand that Respondent reimburse EPA for all response costs incurred by the United States including those costs incurred in overseeing Respondent's implementation of the requirements of this Order or in performing any response action which Respondent fail to perform pursuant to this Order. EPA may submit to Respondent, on a periodic basis, an accounting of all response costs incurred by the United States with respect to this Order. Response costs may include, but are not limited to, costs incurred by the United States in overseeing Respondent's implementation of the requirements of this Order and in performing activities as part of the RD/RA and community relations, including any costs incurred while obtaining access for Respondent. Costs shall include all direct and indirect costs, including, but not limited to, time and travel costs of EPA personnel and associated indirect costs, contractor costs,

cooperative agreement costs, compliance monitoring, including the collection and analysis of split samples, inspection of RD/RA activities, Site visits, discussions regarding disputes that may arise as a result of this Order, review and approval or disapproval of reports, and costs of performing any Work which Respondent failed to perform pursuant to this Order. EPA's certified Agency Financial Management System summary data (SPUR Reports), or such other data summary as certified by EPA, shall serve as the basis for payment demands.

B. EPA's demand for payment shall request that Respondent, within thirty (30) days of receipt of each EPA accounting, remit a certified or cashier's check for the amount of those costs. Interest shall accrue from the latter of the date that payment of a specified amount is demanded in writing, or the date of the expenditure. The interest rate is the rate established by the Department of the Treasury pursuant to 31 U.S.C. § 3717 and 4 C.F.R. § 102.13.

C. Checks shall be made payable to "EPA Hazardous Substances Superfund" and shall include the name of the Site, the Site, identification number, the account number and the title of this Order. Checks shall be forwarded to:

EPA-REGION IV
Attn: Superfund Accounting
P.O. Box 100142
Atlanta, GA 30384

D. Respondent shall send copies of each check and transmittal letter to EPA's Project Coordinator.

XXIV. UNITED STATES NOT LIABLE

The United States, by issuance of this Order, assumes no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondent, or its directors, officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order. Neither EPA nor the United States may be deemed to be a party to any contract entered into by Respondent or their directors, officers, employees, agents, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order.

XXV. ENFORCEMENT AND RESERVATIONS

A. EPA reserves the right to bring an action against Respondent under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any past or future response costs incurred by the United States related to the Site and not previously reimbursed by Respondent. This reservation shall include but not be limited to past costs, indirect costs, the cost of oversight, costs for compiling the cost documentation to support an oversight cost demand, as well as accrual of interest as provided in Section 107(a) of CERCLA.

B. Notwithstanding any other provision of this Order, at any time during the response action, EPA may perform its own studies, complete the response action (or any portion of the response action) as provided in CERCLA and the NCP, and seek reimbursement from Respondent for its costs, or seek any other appropriate relief.

C. Nothing herein shall preclude EPA from continuing any existing enforcement actions and/or taking any additional enforcement actions, including modification of this Order or issuance of additional orders, and/or additional remedial or removal actions as EPA may deem necessary, or from requiring Respondent in the future to perform additional activities pursuant to CERCLA, 42 U.S.C. § 9606(a), et seq. or any other applicable law, or from seeking judicial enforcement of this Order. Respondent shall be liable under CERCLA Section 107(a), 42 U.S.C. § 9607(a), for the costs of any such additional actions.

D. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA, SWDA, and any other applicable statutes and regulations.

E. Respondent shall be subject to civil penalties under Section 106(b) of CERCLA, 42 U.S.C. § 9606(b), of not more than \$27,500¹ for each day in which a violation of this Order occurs or such failure to comply continues. Failure to comply with this Order, or any portion hereof, without sufficient cause, may result in liability under Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), for punitive damages in an amount at least equal to, and not more than three times the amount of any costs

¹Effective January 30, 1997, the Debt Collection Improvement Act of 1996 (31 U.S.C. § 3701), adjusted for inflation EPA's civil monetary penalties through the issuance of the Civil Monetary Penalty Inflation Adjustment Rule (40 C.F.R. Parts 19 and 27).

incurred by the Fund (as defined in CERCLA) as a result of such failure to take proper action.

F. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action, or demand in law or equity against any person, firm, partnership, subsidiary or corporation for any liability it may have arising out of or relating in any way to the Site.

XXVI. ADMINISTRATIVE RECORD

Upon request by EPA, Respondent must submit to EPA all documents related to the selection of the response action for possible inclusion in the administrative record file. The Administrative Record supporting this action is available for review at U.S. EPA, Region IV, 61 Forsyth Street, 9th Floor, Atlanta, Georgia, 30303.

XXVII. EFFECTIVE DATE AND COMPUTATION OF TIME

This Order shall be effective 15 days after this Order is signed by the Deputy Director of the Waste Management Division, EPA Region IV. All times for performance of ordered activities shall be calculated from this effective date. When computing any period of time under this Order, if the last day would fall on a Saturday, Sunday, or legal holiday, the period shall run until the next working day.

XXIII. OPPORTUNITY TO CONFER

A. Respondent may, within five (5) days after this Order is signed by the Deputy Director of the Waste Management Division, EPA Region IV, make a written or oral request for a conference with EPA Region IV to discuss this Order. If requested, the

conference shall occur at 61 Forsyth Street, Atlanta, GA 30303. All telephone communications regarding a conference should be directed to Rudolph C. Tanasijevich at (404) 562-9557, or to Randy Bryant at (404) 562-8938. The written request for a conference may be delivered to EPA by some means of personal delivery other than certified mail.

B. The purpose and scope of the conference shall be limited to issues involving the implementation of the response actions required by this Order and the extent to which Respondent intends to comply with this Order. This conference is not an evidentiary hearing, and does not constitute a proceeding to challenge this Order. It does not give Respondent a right to seek review of this Order, or to seek resolution of potential liability, and no official stenographic record of the conference will be made. At any conference held pursuant to Respondent's request, Respondent may appear in person or by an attorney or other representatives.

XXIX. NOTICE OF INTENT TO COMPLY

Respondent shall provide, not later than five (5) days after the effective date of this Order, written or verbal notice to EPA stating unequivocally whether it will comply with the terms of this Order. Any verbal notice must be confirmed in writing within two (2) days of the giving of such verbal notice. A written notice of intent (or written confirmation, as the case may be) may be delivered to EPA by some means of personal delivery other than certified mail. If Respondent does not provide notice within five (5) days as specified above, or if Respondent provides notice which does not state unequivocally

that Respondent will comply with the terms of this Order, then Respondent shall be deemed to have failed and refused to comply with this Order and to have violated this Order. The written notice or written confirmation required by this paragraph shall set forth, using facts that exist on or prior to the effective date of this Order, any "sufficient cause" defenses asserted by Respondent under Sections 106(b) and 107(c)(3) of CERCLA. The absence of a response by EPA to the notice required by this paragraph shall not be deemed to be an acceptance of Respondent's assertions.

XXX. MODIFICATION

No material modifications shall be made to this Order without written notification to and written approval of EPA. The notification required by this Section shall set forth the nature of and reasons for the requested modification. No oral modification of this Order shall be effective. Modifications that do not materially alter the requirements of this Order, such as minor schedule changes, may be made upon the written approval of EPA. Nothing in this paragraph shall be deemed to alter EPA's authority to supervise and modify this Order.

XXXI. SEVERABILITY

If a court issues an order that invalidates any provision of this Order or finds that Respondent has sufficient cause not to comply with one or more provisions of this Order, Respondent shall remain bound to comply with all provisions of this Order not

invalidated or determined to be subject to a sufficient cause defense by the court's order.

So Ordered, this 11TH day of JULY, 1997.

BY: 

Richard D. Green
Acting Director, Waste Management Division
Region IV
U.S. Environmental Protection Agency

EFFECTIVE DATE: _____

APPENDICES

- Appendix 1 Record of Decision
- Appendix 2 Scope of Work
- Appendix 3 Site Map

RECORD OF DECISION DECLARATION

SITE NAME AND LOCATION

Chevron Chemical Company
Orlando, Florida

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Site noted above. The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this Site.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the Remedial Investigation (RI) and Feasibility Study (FS) process for the Chevron Chemical Company Site. In accordance with 40 CFR 300.430, FDEP, as the support agency, has provided input during the RI/FS process. FDEP agrees with the groundwater remedy, but does not agree with no further action for soil. FDEP is unwilling to concur with the ROD because the State would prefer a risk level no greater than 1×10^{-6} . The potential risk associated with future residential exposure at the adjacent trailer park is 9.0×10^{-6} . The potential risk associated with future commercial exposure at the Site is 2.0×10^{-5} .

ASSESSMENT OF THE SITE

Unacceptable risk associated with this Site is due to the potential future consumption of groundwater containing contaminants above either federal or State of Florida groundwater standards. Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This remedy addresses the principal threats posed by the environmental conditions at this Site.

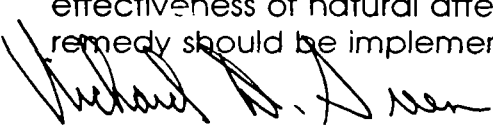
The major components of the remedy include:

- Natural attenuation
- Groundwater monitoring to document achievement of the groundwater cleanup levels.
- A contingency plan that includes the installation of a subsurface filter wall if natural attenuation does not continue as expected. Additional enhancements, such as limited air sparging, hydraulic gradient control, or source removal will be implemented if necessary.
- Institutional controls

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site. This remedy does not satisfy the statutory preference for treatment as a principal element. However, the contaminants in groundwater are expected to naturally attenuate within 8-10 years. In addition, given that there is no current exposure to groundwater, there is no need for immediate active treatment measures.

Because the remedy will result in hazardous substances remaining on-site, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. The reviews will be conducted every five years thereafter until health based levels are achieved. Groundwater monitoring data will also be reviewed annually to gauge the effectiveness of natural attenuation and to determine if the contingency remedy should be implemented.


Richard D. Green
Acting Director
Waste Management Division

22 MAY 96
Date

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THE DECISION SUMMARY

1.0 SITE LOCATION AND DESCRIPTION

The Chevron Orlando site is located at 3100 North Orange Blossom Trail (Highway 441) in Orlando, Orange County, Florida (see Figure 1). The site is in Township 22 S, Range 29 E, Section 15. As shown on Figure 2, the site is bordered on the east by Orange Blossom Trail and to the south by active railroad tracks. The land use in the areas to the south and west of the site is light industrial. The Armstrong Trailer Park, which is a residential mobile home park, borders the site to the north. The 441 Trailer Park is north of the Armstrong Trailer Park, and across Orange Blossom Trail to the east of the site. The Lake Fairview Commerce Center is directly across Orange Blossom Trail to the east of the site.

The site is 4.39 acres in size and is currently cleared, vegetated with grass, fenced, and unoccupied. Lake Fairview is approximately 700 feet northeast of the site. Lake Fairview is a remnant karst lake, which is approximately 400 acres in size.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Chevron Chemical Company facility was in operation between 1950 and 1976 as a pesticide formulation plant. The facility received unblended products in bulk liquid and powder form, and blended the products to make pesticides and nutritional sprays for bulk wholesale distribution. The unblended products were shipped in primarily by rail, formulated, packaged in drums, and shipped out by truck. The historic site features included several above ground storage tanks, a drum storage area, a drum rinse area, two pesticide rinsate ponds, three septic tank drain fields, and an underground petroleum storage tank. The above ground tanks were used to store the petroleum distillates which were used as blending agents (e.g., xylene, ethylbenzene, and mineral spirits). As shown on Figure 3, the rinsate ponds were located in the northwestern portion of the site. The ponds were used for the collection and disposal of storm water, pesticide formulating rinse water, drum rinse water, and floor wash-down water. The underground storage tank was used to store vehicle fuel. A floor drain was located in the formulating warehouse in a liquid pesticide formulation area. The floor drain discharged onto the ground surface near an abandoned rail spur located along the southern property boundary.

Parathion, chlordane, phaltan, captan, malathion, and paraquat were formulated at the site. DDT, difolatan, BHC-lindane, dieldrin, aldrin, bromamine, and nutritional sprays (aqueous solution of copper, zinc, manganese, sulfur, and boron) were also formulated during this period of

operation. Chemicals used in pesticide formulation included xylene, kerosene, mineral oil, mineral spirits, ethylbenzene, and aromatic naphtha.

Chevron discontinued the formulation of pesticides in 1976. According to Chevron sources, Chevron removed the chemical inventory from the site, drained the equipment lines and backfilled the rinsate ponds with soil.

In 1978, the property was sold and Central Florida Mack Trucks, a truck sales and service company, began operations at the Site. Central Florida Mack Trucks repaired and serviced diesel engine trucks. Body work and painting were also conducted at the site. The facility generated waste oil and waste degreasing solvent (from engine and parts cleaning operation). A waste oil trough was located along the railroad spur on the southwestern side of the site. Used oil filters, waste oil, diesel fuel, paint, and partially filled drums of powdered pesticides were later discovered in the rinsate pond area during the first Removal Action, along with discarded truck parts and debris.

In March 1984, during the operation of Central Florida Mack Trucks, a tanker truck (owned by Waste Management, Inc.) filled with 3% hydrochloric acid and an unknown amount of nitric acid, was stored on-site for repair. The tanker leaked an estimated 3,000 to 6,000 gallons of acid, which resulted in an explosion in the vicinity of the western rinsate pond. Waste Management excavated the spill area and disposed of the contaminated soils.

Central Florida Mack Trucks discontinued its operation at the Site in November 1986. On March 1, 1991, the pesticide formulating/warehouse building on site burned down. The building debris was cleared from the rail spur area and the south side of the site was fenced. Chevron purchased the property in foreclosure from First Union Bank and the Resolution Trust Company in 1993 and 1994, respectively.

During the period from 1982 to 1989, several investigations were conducted to assess the conditions at the site. The results of these studies indicated the presence of some pesticides, VOCs, and metals in soil and/or groundwater samples.

In May 1989, an EPA contractor conducted a field investigation under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Samples from the surface and subsurface soils and the groundwater were collected at the site. The results of the sampling activities identified the presence of pesticides, benzene, toluene, xylene, naphthalene compounds, and metals in soil samples collected along the rail spur adjacent to the former outfall from the floor drain. Chlordane was detected in soil samples collected in the southwest corner of the site. Pesticides, metals, benzene, toluene, xylene, and naphthalene compounds were detected in soil samples collected in the vicinity of the former rinsate ponds.

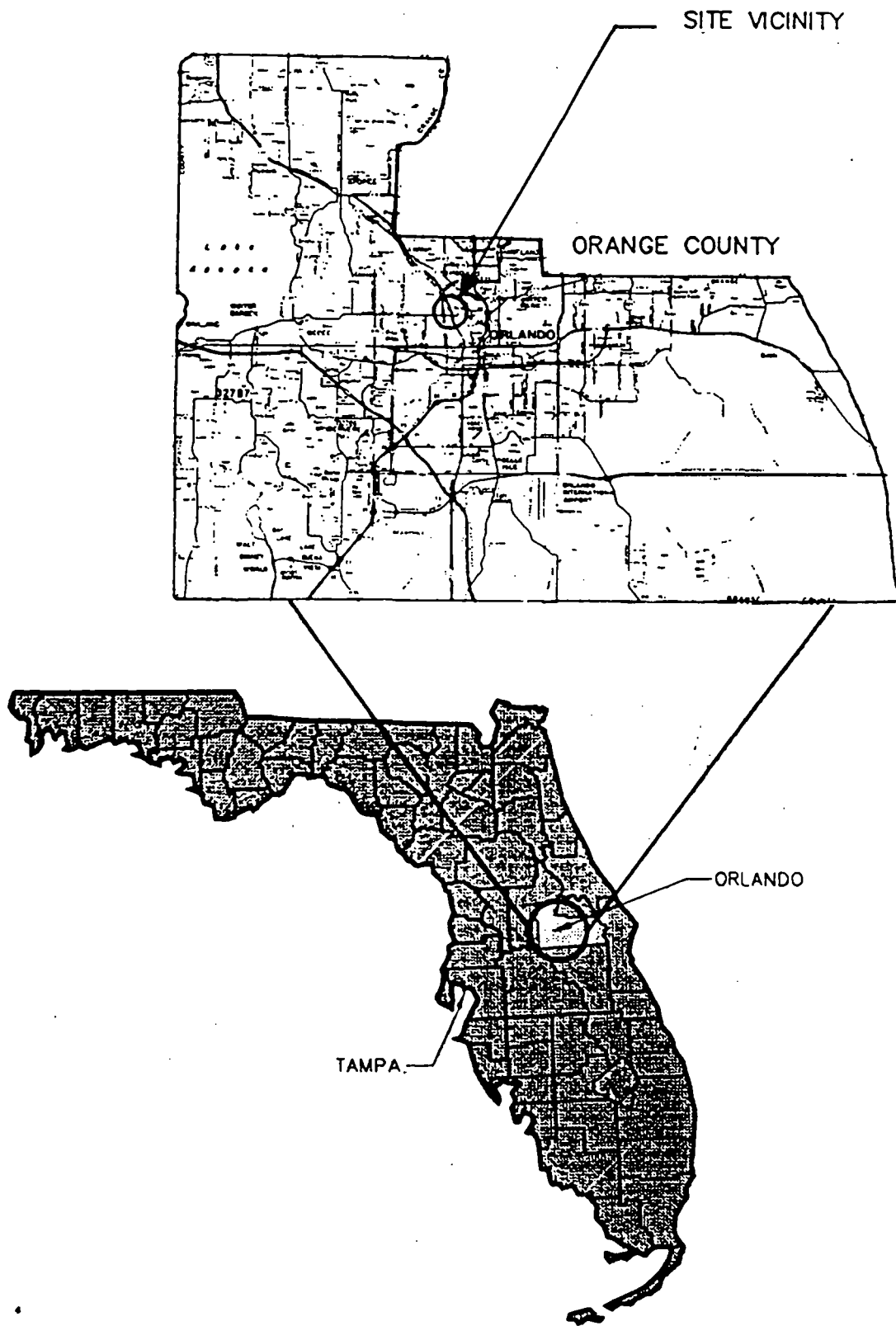


Figure 1
Location Map

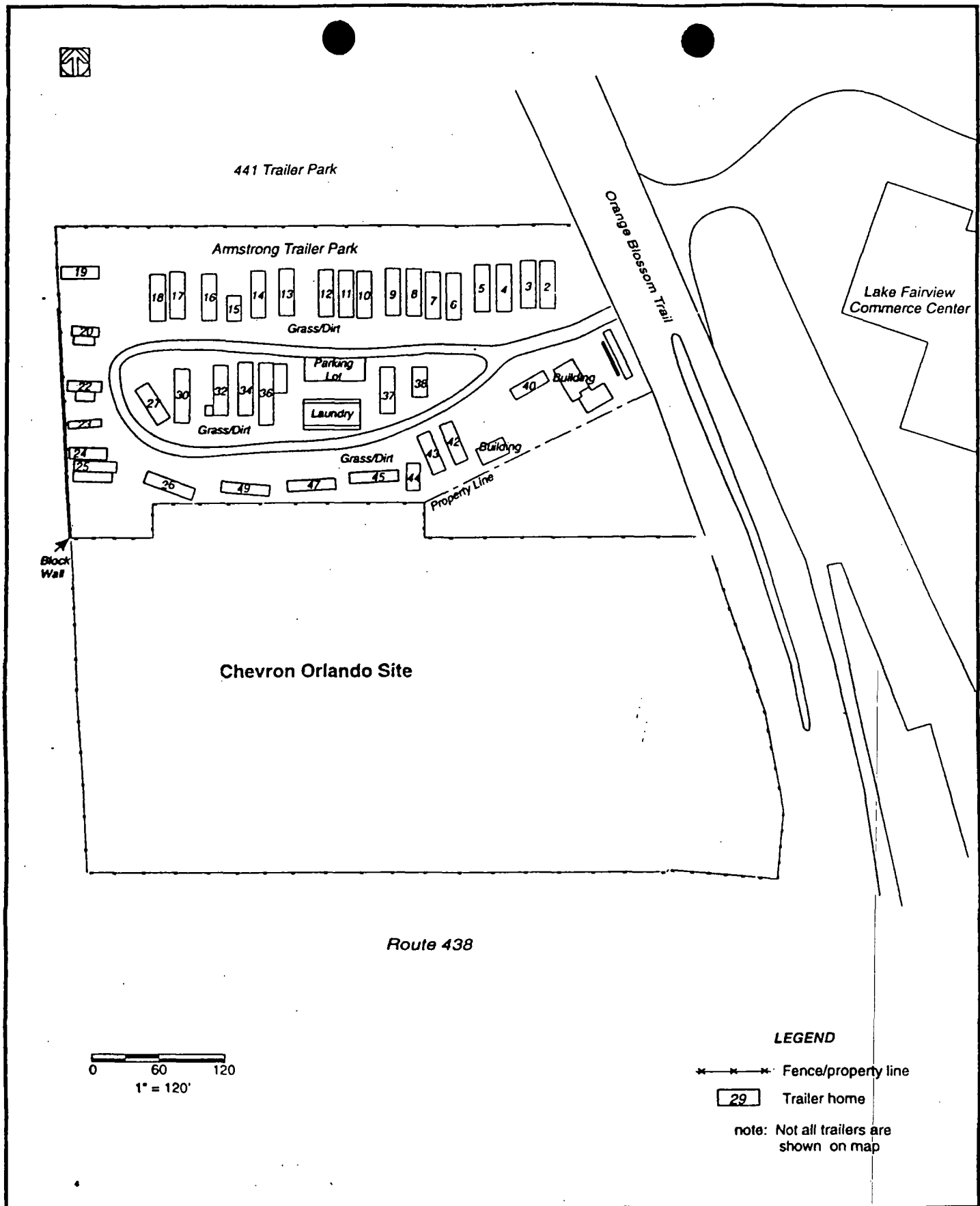


Figure 2. Study area; Chevron, Orlando site.

TASK
ENVIRONMENTAL

PT Environmental Services

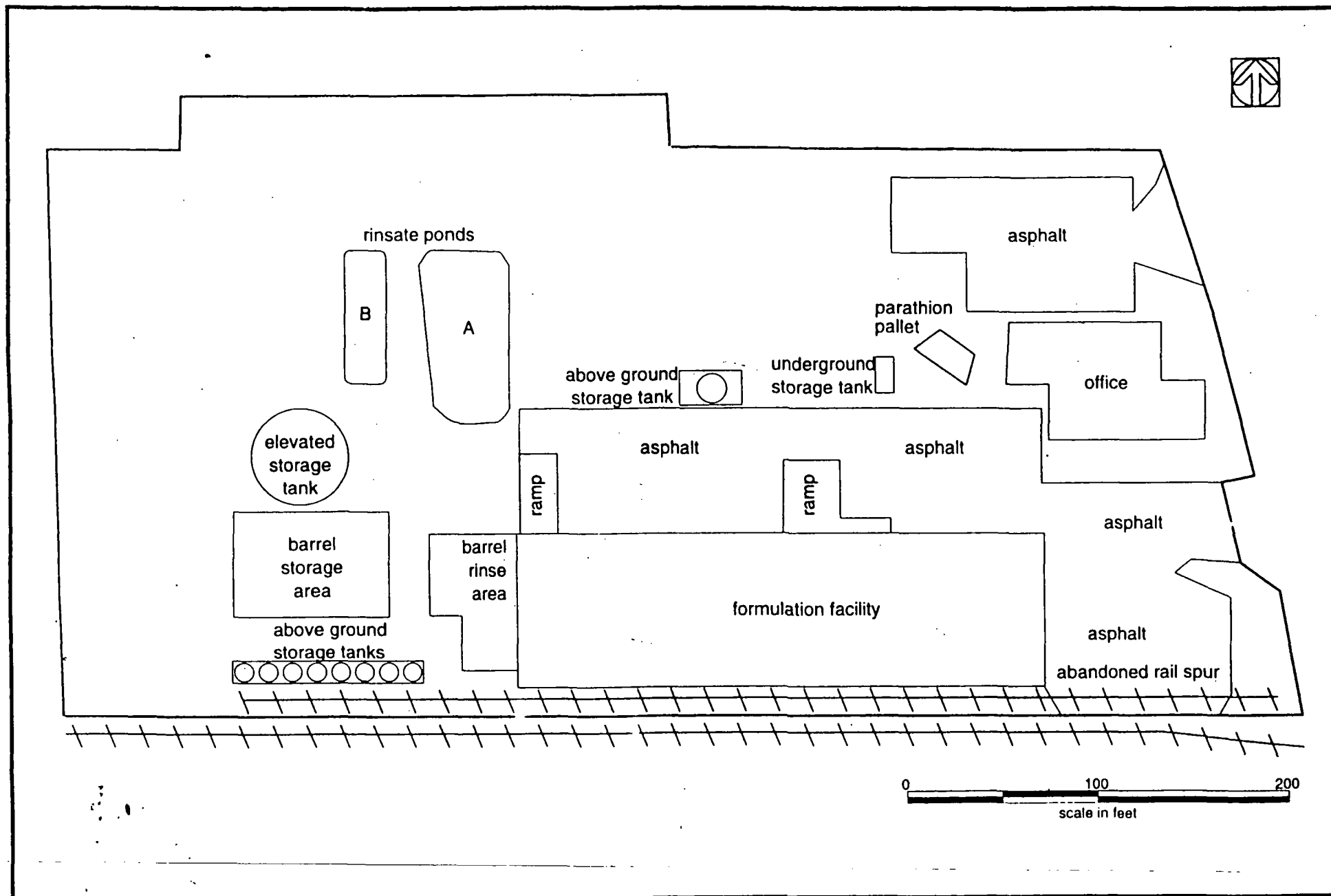


Figure 3. Historic site layout for former Chevron, Orlando facility.
(All structures have been removed)

TASK
ENVIRONMENTAL

PTI Environmental Services

Analysis of the groundwater samples identified metals, benzene, toluene, and xylene in the samples collected near the floor drain outfall. Metals, pesticides, xylene, benzene, trichloroethylene, and chlorobenzene were detected in the groundwater samples collected in the vicinity of the rinsate ponds.

During 1990, as a result of these studies, EPA and Chevron signed an Administrative Order on Consent (AOC) for a removal action at the Site. Site contamination was further assessed in accordance with the requirements of the AOC.

The results of the assessment activities were used to define general areas of soil contamination, and to identify the presence of groundwater contamination. The primary contaminants of interest identified through the assessment were chlordane, DDT (and its daughter products), parathion, and a variety of petroleum hydrocarbons.

The assessment results were also used to plan the Removal Action activities. The Removal Action activities focused on removal of material which could be a source of groundwater contamination or a risk to human health, and included the soil in the rinsate pond area, along the railroad spur, and adjacent to the historic aboveground storage tank area. The EPA authorized Chevron to proceed with the Removal Action in August 1991.

The Agency for Toxic Substances and Disease Registry (ATSDR) defined the removal action goals and cleanup levels for the soils on site, to be protective of human health via the inhalation and dermal contact routes of exposure. The ATSDR goals were removal of shallow soils (0- to 1-foot below land surface) with chlorinated pesticide concentrations in excess of 50 milligrams per kilogram (mg/kg), and removal of deeper soils (1-foot to the water table) with chlorinated pesticide concentrations in excess of 100 mg/kg. ATSDR recommended the use of chlordane as an indicator chemical because chlordane was considered the most prevalent and most toxic compound to humans and was found in the highest concentrations.

Prior to the removal action, additional sampling was conducted to evaluate the potential for off-site migration of contaminants in the groundwater and to evaluate the magnitude and extent of soil contamination. Soil samples were collected using a 50-foot by 50-foot grid established across the site. Samples were collected from 2 to 4 feet below land surface (BLS), 4 to 6 feet BLS, and 8 to 10 feet BLS. Groundwater samples were collected via a Hydropunch and the installation of four additional clusters of wells. Petroleum hydrocarbons such as benzene, ethylbenzene, and xylene were the predominant groundwater contaminants. Chlorinated pesticides were detected sporadically; a-BHC and b-BHC were the most frequently detected pesticides.

The removal action was conducted during the period from December 1991 through September 1992. All site structures were demolished and removed. Approximately 17,780 tons of pesticide contaminated soil were excavated and disposed of; 4,900 tons of petroleum contaminated soil were excavated and treated; and 126,000 gallons of recovered stormwater and groundwater were treated and discharged into an on site infiltration trench. All of the excavated areas were backfilled with clean soil and the site was graded and seeded. Figure 4 shows the areas that were excavated, and the depths of each excavation.

In April 1993, Chevron and EPA entered into a separate AOC to conduct an RI/FS pursuant to the EPA policy known as the Superfund Accelerated Cleanup Model (SACM). The purpose of the RI/FS was to evaluate groundwater contamination at the Site and to evaluate potential soil contamination in an adjacent trailer park and areas of off-site drainage.

Soil sampling was conducted in two phases at the adjacent Armstrong Trailer Park. Based on the results of the sampling, a removal action was conducted at the trailer park during March and April 1994. The soil cleanup level was 4.9 ppm of chlordane. Approximately 230 tons of contaminated soil was excavated from the trailer park. Most of the contaminated soil was removed from an area adjacent to the northwest corner of the Site, a probable location for surface water runoff (see Figure 5).

Groundwater sampling was also conducted in phases during the RI. Nine existing monitoring wells were sampled in April 1993. Seventeen additional wells were installed and subsequently sampled during September and October 1993.

The site was finalized on the NPL during May 1994. The RI/FS documents were finalized during March 1995.

3.0 HISTORY OF COMMUNITY RELATIONS

A public meeting was held on November 20, 1991, prior to the on-site removal action. In addition, an administrative record and public comment period were also established for the removal action.

A public meeting was held on July 29, 1993 to explain the upcoming RI/FS activities at the Site. The meeting was held at the Fire Fighters Council Hall in Orlando. Another public meeting was held on March 17, 1994 prior to the removal action at the Armstrong Trailer Park. The meeting was conducted at the trailer park.

A fact sheet describing the status of Superfund activities was mailed to the community during July 1994.

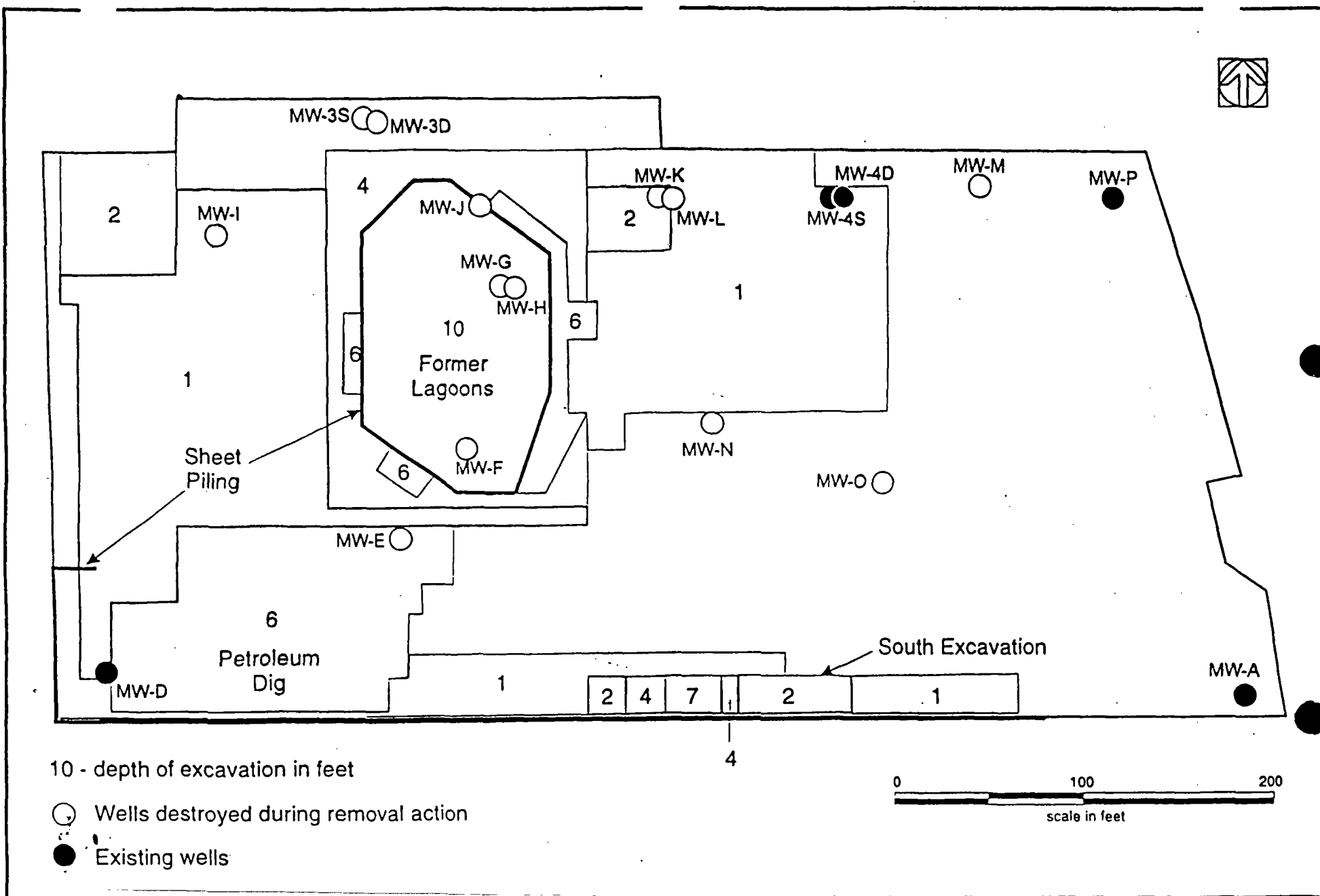


Figure 4. Areas and depths of excavated soil from the 1991 Removal Action (BCC 1991); Chevron, Orlando site.

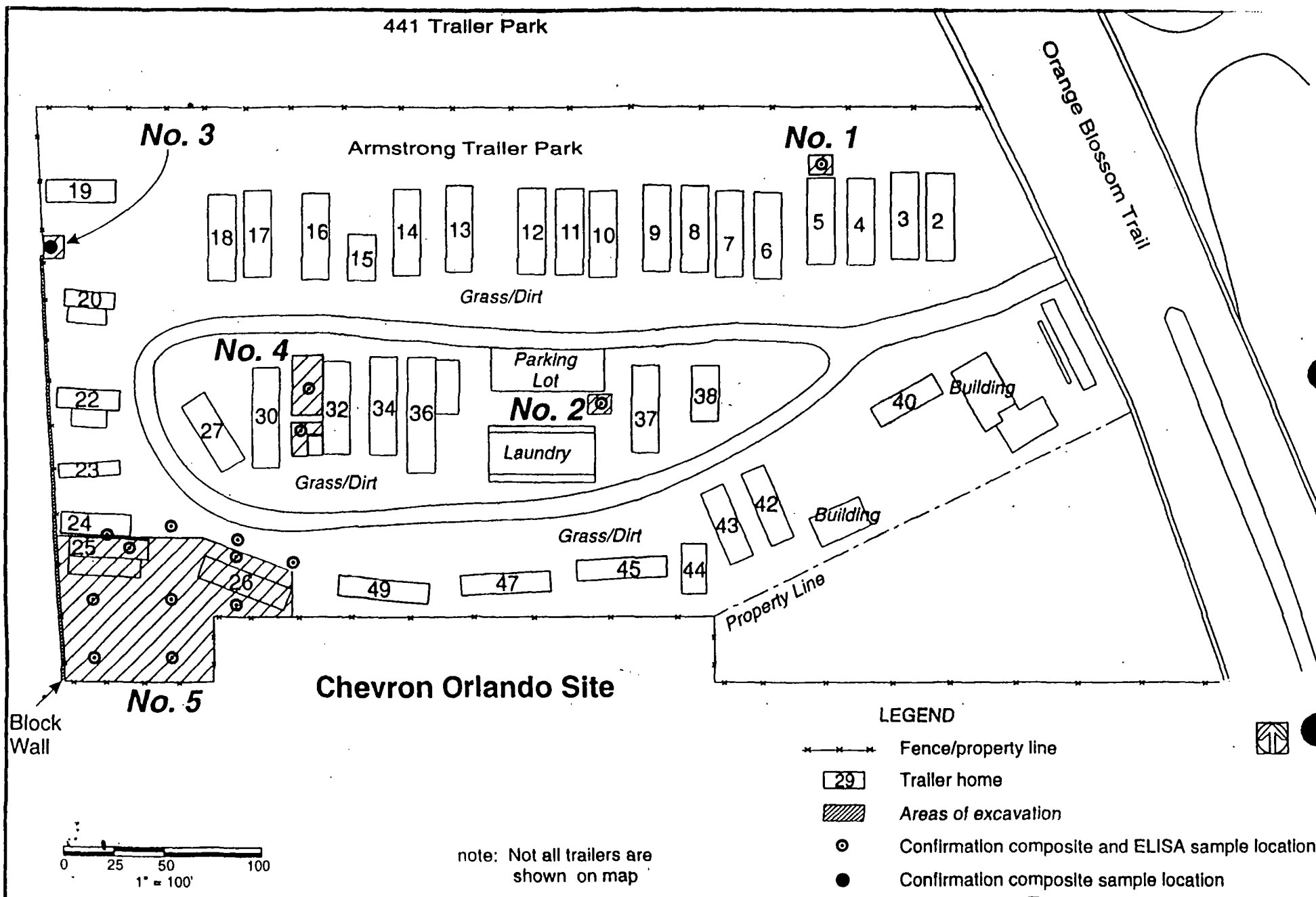


FIGURE 5 Armstrong Trailer Park Removal Action Excavation Locations

The Florida Department of Health and Rehabilitative Services (HRS) held a meeting on March 9, 1995 at the Armstrong Trailer Park. HRS held the meeting to discuss their health assessment of the Site. EPA staff were present to discuss Superfund activities.

The Proposed Plan fact sheet was mailed to the community on July 18, 1995. The administrative record was updated and relocated to the Edgewater Branch Public Library, which is closer to the Site. A public meeting was held on July 26, 1995 at the Edgewater Branch Public Library. The public comment period was held from July 21, 1995 to August 18, 1995.

4.0 SCOPE AND ROLE OF ACTION

The planned actions for this Site address groundwater contamination. The ROD further describes this remedy and is the only ROD anticipated for this Site.

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 Geology

The Chevron Orlando site is located in north-central Orange County, on the Florida Peninsula. The topography of Orange County includes a highland region which extends across the western part of the county, and a lowland region in the eastern portion of the county along the St. Johns River. The Orlando Ridge, Mount Dora Ridge, and part of the Lake Wales Ridge make up the highland region, which is mostly sand hills or remnants of fossil beach ridges that parallel the Atlantic coast.

The site lies within the Osceola Plain, in a small area between the Orlando and Mount Dora Ridges. The ridges are differentiated from surrounding plains by the profusion of mature karst lakes. The drainage in the vicinity of the site is controlled by the topography, with the drainage basins for groups of lakes defined by relic beach ridges.

The main drainage features in Orange County include small seasonal streams, lakes and sinkholes. Drainage in Orange County, specifically in the Orlando area, also occurs through drainage wells. Between 1906 to 1961, approximately 300 drainage wells were drilled in Orange County to control the water levels in the area lakes. The sinkhole lakes within the west-central part of the county have no natural drainage outlets, except for infiltration into the surficial aquifer. The maximum water level elevation in a lake is controlled by a fixed-elevation weir. As the water level in the lake rises in response to rainfall and overtops the weir, the overflow is channeled into the drainage wells. The drainage wells are constructed into the Floridan aquifer. Lake Fairview is the closest lake to the Site. The southernmost edge of the lake is located

approximately 700 feet northwest of the Site.

The land surface elevation of the site ranges between 97 and 102 feet above mean sea level. The elevation decreases to the north and east. Historically, stormwater runoff flowed across the site to the north into a drainage ditch, which discharged into a small pond in the northwest corner of the site. The site topography was modified during the first Removal Action to promote on-site infiltration of stormwater. Prior to the Removal Action, the eastern portion of the site (which was covered with asphalt) drained to the east into the storm drain system along Orange Blossom Trail.

5.2 Area Hydrogeology

Orange County is underlain by a wedge of marine limestone, dolomite, shale, sand and anhydrite that is approximately 6,500 feet thick. Overlying the crystalline basement in succession are the Eocene age Lake City limestone (over 700 feet thick), the Avon Park limestone (400 to 600 feet thick), and the Ocala limestone (0 to 125 feet thick) which may be highly eroded or missing in some parts of the county. These formations, and permeable portions of the Hawthorn formation, comprise the Floridan aquifer.

The Floridan aquifer is divided into two major producing zones, the upper zone (between 150 and 600 feet BLS) and the lower zone (between 1,100 feet and 1,500 feet BLS). The producing zones are composed of dolomitic limestone and are separated by less permeable layers of soft limestones. The lower producing zone is a main source of municipal water supply for much of Orlando and Winter Park.

The Miocene age Hawthorn formation (50 to 300 feet thick) overlies the Ocala limestone. The upper Hawthorn is made up of gray-green, clayey, quartz sand and silt, and acts as a confining unit between the surficial aquifer and the Floridan aquifer. The lower part of the Hawthorn formation is comprised of limestone with phosphorite and quartz sand. In areas where the lower part of the formation produce water, it is considered to be part of the Floridan aquifer. However, this water producing unit of the Hawthorn formation may not be present in all parts of the county.

Discharge from the surficial aquifer occurs through domestic water supplies throughout Orange County. Most of the wells constructed in the unconfined aquifer are small in diameter and produce approximately 5 to 10 gallons per minute. Additional discharge from the surficial aquifer occurs through seepage into lakes and streams during periods of low flow and drought, as well as downward leakage to the Floridan aquifer. The majority of recharge to the surficial aquifer comes from rainfall, and infiltration from surface water bodies. However, upward leakage from the Floridan aquifer may recharge the surficial aquifer in areas where the potentiometric surface of the Floridan

aquifer is above the water table. The direction of groundwater flow in the surficial aquifer is controlled by topography.

Some recharge to the Floridan aquifer occurs through infiltration of rainfall through semi-permeable confining layers, but most occurs through the drainage wells in the county. The groundwater flow direction in the Floridan aquifer is generally easterly and northeasterly. The regional flow is influenced locally by the effects of pumping wells, seasonal fluctuations, and drainage wells.

The climate in the area is semi-tropical with an average annual temperature of 71.8 degrees Fahrenheit (°F) with minor seasonal fluctuations. The average temperature in the winter is 61.1 °F, and 81.1 °F in the summer.

Rainfall is approximately 48 inches per year, with the most precipitation occurring between June and September. November is the driest month with an average rainfall of 1.78 inches. July is the wettest month with an average rainfall of 7.78 inches. The wind flow in the area is predominantly from the north and east. However, the wind does not blow in a single direction more than 10 percent of the time.

5.3 Site Hydrogeology

The shallow lithology underlying the site was defined during construction of monitor wells and soil borings. Quartz sand, with varying amounts of silt and organic material was encountered from 0 to 27 feet below land surface (BLS). The sand is fine to medium grained, and ranges in color from brown to light tan. Organic material was observed in the upper 10 to 15 feet of the sand unit, along with stringers of clay. The lower portion of the unit grades from sand in an organic matrix to sand in a light tan calcareous mud matrix.

The contact with the Hawthorn formation appears to be an erosional surface, represented by a decreasing percentage of sand and an increasing percentage of calcareous clay. In MW-14, a distinctive clay horizon was encountered at 40-feet below land surface. The gray silty clay layer is approximately 20 feet thick. Olive green clay with phosphorite nodules, which is characteristic of the upper Hawthorn formation, was encountered in MW-14 at approximately 65-feet BLS. The first limestone unit of the Hawthorn formation was encountered at 78-feet BLS. The limestone is light grey, with distinctive phosphorite nodules.

The saturated thickness of the surficial aquifer at the site is 17 to 20 feet. The depth to groundwater at the site is usually within 10 feet of the land surface. The groundwater flow across the site is to the northeast toward Lake Fairview with a gradient of approximately .006 feet/feet. The potentiometric surface elevation in the upper Floridan aquifer, as measured in MW-14, is

approximately 20 feet lower than the water table elevation measured on the site.

An aquifer performance test was conducted at the site to determine the characteristics of the surficial aquifer. The data produced by the pumping test were evaluated using various methods to best address the anticipated delayed yield and partial penetration. The static water level was measured in two monitor wells to identify potential areal influences on the water table elevation for a period of 24-hours before the pumping test began. The pumping test data interpretation provided a range of transmissivity values from 700 to 1000 feet²/day. A hydraulic conductivity value of 52 feet/day was selected for use in the groundwater flow model, as most representative of the areawide surficial aquifer.

The water level in MW-14 (the Hawthorn formation monitor well) was also measured during the pumping test, to determine whether a connection between the surficial aquifer and the first water producing zone of the Floridan aquifer exists on the site. No change in water level was measured in MW-14 that could be related to the test.

A well survey was conducted within a radius of one mile around the site. The files at the Florida Department of Environmental Regulation (now the Department of Environmental Protection), the St. Johns Water Management District, and the U.S. Geological Survey were reviewed to complete the survey. Eight wells were identified within a one mile radius of the site, but none of these wells are down gradient of the site. The closest well is located approximately 3800 feet northwest of the Site.

5.4 Soil Contamination

The previous on-site removal addressed much of the soil contaminated with chlorinated pesticides (including chlordane) and petroleum at the Site. The soil cleanup level was a chlordane concentration of 50 ppm in the upper one foot of soil and 100 ppm for the deeper soils. Excavation depths varied from 0 - 10 feet and, as a result, 50 percent of the surface area and 17 percent of the deeper soil was excavated and replaced by clean fill.

The contaminants of concern in on-site soil are summarized in Tables 1 and 2. Other organic compounds and pesticides were detected but are not evaluated further due to low detection frequencies or low concentrations relative to screening values. The contaminants of concern in off-site soil are summarized in Table 3. The exposure point concentration listed in the following tables is the statistical 95% UCL for the average value unless it exceeds the maximum value detected or is below the minimum value detected. In those cases, the maximum detected value is used.

TABLE 1: CONTAMINANTS OF CONCERN IN ON-SITE SURFACE SOIL

Contaminant	Frequency of Detection	Range of Detected Concentrations (mg/kg)	Exposure Point Concentration (mg/kg)
4,4'-DDD	25 / 81	.04 - 21	2.5
4,4'-DDE	12 / 79	.147 - 3.1	1.1
4,4'-DDT	27 / 81	.053 - 58	1.4
Aldrin	5 / 82	.019 - 13	1.2
b-BHC	7 / 82	.005 - 21	1.1
Chlordane	54 / 82	.088 - 79	8.6
Dieldrin	12 / 79	.029 - 11	1.2
Heptachlor Epoxide	4 / 80	.0058 - 0.6	0.6

TABLE 2: CONTAMINANTS OF CONCERN IN ON-SITE SURFACE & SUBSURFACE SOIL

Contaminant	Frequency of Detection	Range of Detected Concentrations (mg/kg)	Exposure Point Concentration (mg/kg)
4,4'-DDD	126 / 271	.01 - 210	17
4,4'-DDE	49 / 215	.007 - 21	2.1
4,4'-DDT	50 / 271	.053 - 58	2.7
Aldrin	19 / 225	.019 - 23	1.5
α-BHC	13 / 225	.5 - 130	1.4
b-BHC	15 / 225	.005 - 21	1.2
Chlordane	187 / 273	.048 - 350	46
Dieldrin	56 / 222	.029 - 16	2
γ-BHC (lindane)	12 / 225	.3 - 19	1.4
Endrin	14 / 216	.014 - 6.7	6.7

TABLE 3: CONTAMINANTS OF CONCERN IN OFF-SITE SURFACE SOIL			
Contaminant	Frequency of Detection	Range of Detected Concentrations (mg/kg)	Exposure Point Concentration (mg/kg)
Chlordane	50 / 53	.004 - 5.3	3.9
Lead	7 / 7	15 - 130	79
Dieldrin	16 / 53	.079 - 1.1	0.066

The removal at the adjacent trailer park addressed soil contaminated by surface water runoff from the Site. The soil cleanup level for the trailer park was a chlordane concentration of 4.9 ppm and was based on protecting human health in a residential setting.

5.5 Groundwater Contamination

Certain VOCs, pesticides, and metals have been detected in some monitoring wells at the Site. The groundwater contaminants vary in concentration, location and depth underneath and adjacent to the Site. Groundwater contamination has been found at depths ranging from approximately 5 to 30 feet bls. Low level groundwater contamination extends in a northeast direction under the Site and the eastern portion of the upgradient trailer park. Site contaminants have not been detected in the monitoring well located upgradient of Lake Fairview. The contaminants of concern in groundwater at the Site are summarized in Table 4. Other organic compounds and pesticides were detected but are not evaluated further due to low detection frequencies or low concentrations relative to screening values. The locations of the groundwater monitoring wells are shown in Figure 6. One well, MW-14, was installed and screened at a depth of 82-94 feet. Trace amounts of chromium and lead were detected along with bis(2-ethyl hexyl) phthlate and di-n-octyl phthlate.

6.0 SUMMARY OF SITE RISKS

CERCLA directs EPA to conduct a baseline risk assessment to determine whether a Superfund Site poses a current or potential threat to human health and the environment in the absence of any remedial action. The baseline risk assessment provides the basis for taking action and indicates the exposure pathways that need to be addressed by the remedial action. This section of the ROD reports the results of the baseline risk assessment conducted for this Site.

TABLE 4: Groundwater Contaminants			
GROUNDWATER CONTAMINANT	FREQUENCY OF DETECTION (April 1995)	RANGE OF DETECTED CONCENTRATIONS (ug/l)	CLEANUP STANDARD (ug/l)
Benzene	9 / 25	1.1 - 23	1
Ethylbenzene	12 / 25	.9 - 380	30
Xylenes	13 / 25	4 - 1,100	20
Total Napthalenes	3 / 25	25 - 26	100
4,4'-DDD	4 / 25	.12 - 2.2	0.1
α-BHC	10 / 25	.16 - 19	0.05
b-BHC	12 / 25	.15 - 47	0.1
g-BHC (Lindane)	3 / 25	.87 - 2.4	0.2
Chlordane	3 / 25	1.1 - 17	2
Arsenic	2 / 25	10 - 34	50
Chromium	2 / 25	70 - 3,200	100
Lead	8 / 25	5 - 66	15

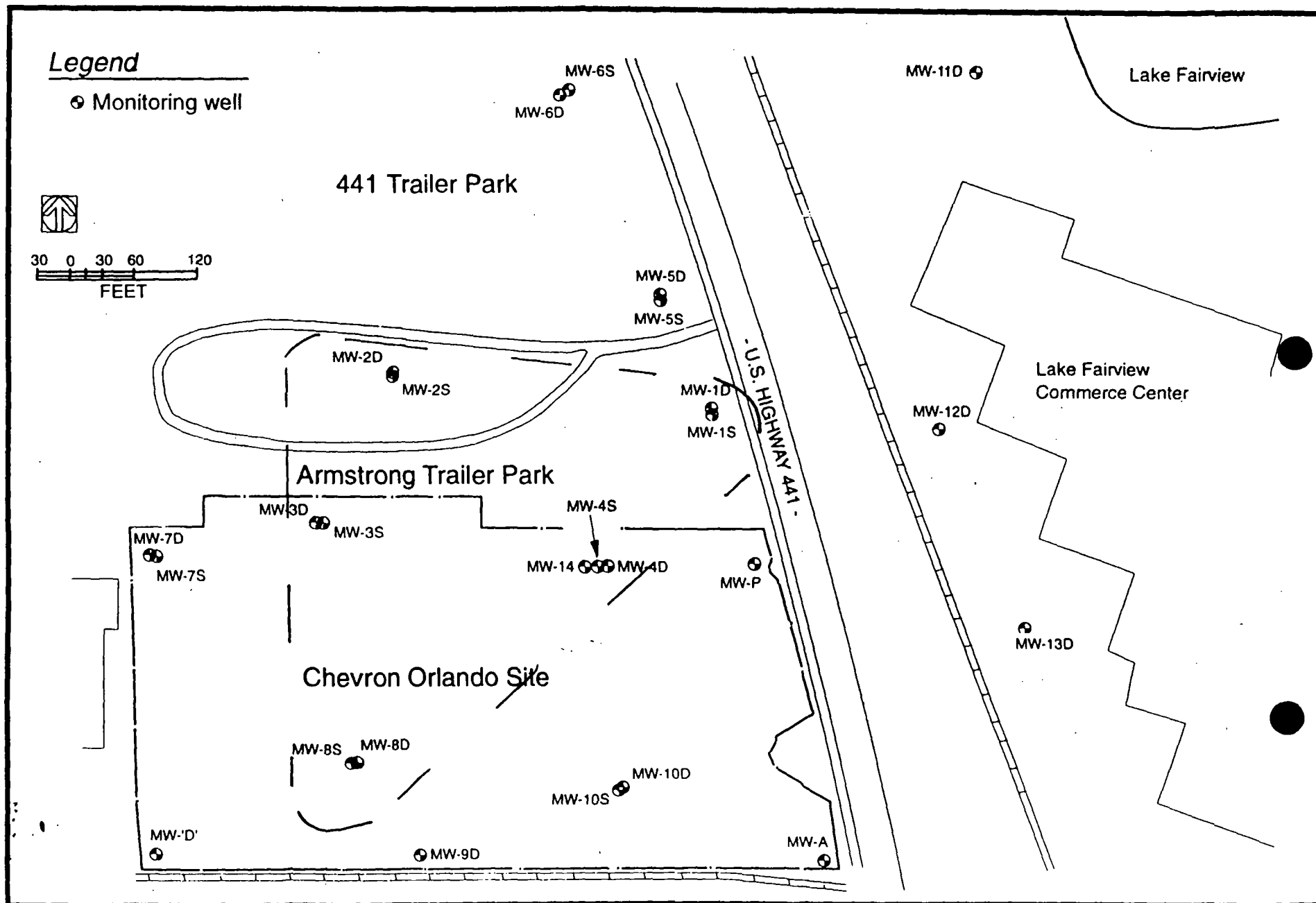


Figure 6 Map of Chevron, Orlando site showing locations of monitoring wells.
 ——— Approximate extent of plume

TASK
ENVIRONMENTAL

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6.1 Contaminants of Concern

The chemicals measured in the various environmental media during the RI were included in this discussion of the site risks if the results of the risk assessment indicated that a contaminant might pose a significant current or future risk or contribute to a cumulative risk which is significant. The criteria for a significant risk was a carcinogenic risk level above the acceptable risk range, i.e., 1×10^{-4} to 1×10^{-6} , or a hazard quotient (HQ) greater than 1.0 (unity). See tables 1-4 for the contaminants of concern in each medium.

The exposure point concentrations for each of the chemicals of concern and the exposure assumptions for each pathway were used to estimate the chronic daily intakes for the potentially complete pathways. The baseline risk assessment is based on the reasonable maximum exposure (RME) that may be encountered during the various Site use scenarios. The RME concentrations are either the calculated 95% Upper Confidence Limit of the arithmetic mean or the maximum concentration detected during sampling. The intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures. If the calculated UCL exceeded the maximum level measured at the Site, then the maximum concentration detected was used to represent the reasonable maximum concentration. The chronic daily intakes were then used in conjunction with cancer slope factors and noncarcinogenic reference doses to evaluate risk.

The exposure point concentrations for on-site soil are based on analytical data collected prior to and as part of the on-site removal action conducted in 1992. The data can be found in the July 1991 Removal Action Plan (see Figure 4-1 and Appendix C) and the December 1992 Removal Action Report (see Appendices E and F). Table 3-5 of the Baseline Risk Assessment, dated March 1995, lists the particular sample points used in the exposure point concentrations. The Baseline Risk Assessment used only those samples collected from areas after excavation was completed or from the remaining areas where no removal excavation was necessary.

The exposure point concentrations for off-site soil (Armstrong Trailer Park) and the current groundwater conditions are presented in the RI Report dated November 1994. There was a removal of some surface soil conducted at the Armstrong Trailer Park during March 1994. Again, the Baseline Risk Assessment used only those samples collected from areas after excavation was completed or from the remaining areas where no removal excavation was necessary.

6.2 Exposure Assessment

Whether a chemical is actually a concern to human health and the environment depends upon the likelihood of exposure, i.e. whether the exposure pathway is currently complete or could be complete in the future. A

complete exposure pathway (a sequence of events leading to contact with a chemical) is defined by the following four elements:

- A source and mechanism of release from the source,
- A transport medium (e.g., surface water, air) and mechanisms of migration through the medium,
- The presence or potential presence of a receptor at the exposure point, and
- A route of exposure (ingestion, inhalation, dermal absorption).

An evaluation was undertaken of all potential exposure pathways which could connect chemical sources at the Site with potential receptors. All possible pathways were first hypothesized and evaluated for completeness using the above criteria. The current pathways represent exposure pathways which could exist under current Site conditions while the future pathways represent exposure pathways which could exist, in the future, if the current exposure conditions change. Exposure by each of these pathways was mathematically modeled using generally conservative assumptions.

TABLE 5: POTENTIAL EXPOSURE PATHWAYS			
Media	Scenario	Receptor	Exposure Pathways
Groundwater	Future	Adult & Child Resident	Ingestion & Inhalation
On-site Surface Soil	Current	Trespasser	Ingestion & Dermal Contact
	Future	Trespasser & Adult Worker	Ingestion & Dermal Contact
On-site Subsurface Soil	Future	Adult Construction Worker	Ingestion & Dermal Contact
Off-site Soil	Current	Child & Adult Resident	Ingestion & Dermal Contact

Vegetation and ground cover present at the Site will impede wind erosion

of soil at the Site. Therefore, exposure to constituents in soil, either as vapor or adsorbed to dust, is not considered significant at the Site under current land use conditions. The presence of vegetation also reduces direct contact with surface soils by Site visitors.

The baseline risk assessment considered commercial and residential land use. There is a mobile home park located just north of the Site and industrial/commercial operations on the all other sides of the Site. Future residential use of the Site is not likely. The current zoning and future land use planning both designate commercial use for the Site and the surrounding area.

6.3 Toxicity Assessment

Toxicity values are used in conjunction with the results of the exposure assessment to characterize Site risk. EPA has developed critical toxicity values for carcinogens and noncarcinogens. Cancer slope factors (CSFs) have been developed for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CSFs, which are expressed in units of $(\text{mg/kg/day})^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day , to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CSF. Use of this conservative approach makes underestimation of the actual cancer risk highly unlikely. CSFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg/day , are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

6.4 Risk Characterization

Human health risks are characterized for potential carcinogenic and noncarcinogenic effects by combining exposure and toxicity information. Excessive lifetime cancer risks are determined by multiplying the estimated daily intake level with the CSF. These risks are probabilities that are generally

expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper boundary, an individual has a one in one million additional (above their normal risk) chance of developing cancer as a result of Site-related exposure to a carcinogen over a 70-year lifetime under the assumed specific exposure conditions at a Site.

EPA considers individual excess cancer risks in the range of 1×10^{-4} to 1×10^{-6} as protective; however the 1×10^{-6} risk level is generally used as the point of departure for setting cleanup levels at Superfund sites. The point of departure risk level of 1×10^{-6} expresses EPA's preference for remedial actions that result in risks at the more protective end of the risk range. The health-based risk levels for the Site are shown in Table 6. The health-based risk levels for off-site soil are shown in Table 7.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminants's reference dose). A HQ which exceeds unity (1) indicates that the daily intake from a scenario exceeds the chemical's reference dose. By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. An HI which exceeds unity indicates that there may be a concern for potential health effects resulting from the cumulative exposure to multiple contaminants within a single medium or across media. The HIs for the Site are shown in Table 6. The HIs for the off-site soil are shown in Table 7.

Exposure to on-site soil under existing conditions and land use does not present an unacceptable carcinogenic risk. Exposure to on-site subsurface soil by a future construction worker yields a hazard index slightly above unity. However, given the conservative assumptions used in the risk assessment, the actual exposure and associated risk is expected to be acceptable. EPA's definition of acceptable risk is found in 40 CFR 300.430 (e)(2).

Future residential use of the site poses an unacceptable risk, primarily due to ingestion of contaminated groundwater. Currently, no drinking water wells are located within the area of the groundwater plume. Exposure to on-site surface soil by a future residential child yields a hazard index slightly above unity. However, given the conservative assumptions used in the risk assessment, the actual exposure and associated risk is expected to be acceptable.

Current and future exposure to soil at the adjacent Armstrong Trailer Park does not pose an unacceptable risk. Ingestion of contaminated groundwater

would pose an unacceptable risk, but no private wells are used at the trailer park. Area residences and businesses are currently supplied by municipal water supply systems; therefore, the groundwater in the surficial aquifer is not consumed and poses no foreseeable risk.

Unacceptable risk associated with this Site is due to the potential future consumption of groundwater containing contaminants above either federal or State of Florida groundwater standards. Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

6.5 Environmental Risk

A qualitative and quantitative risk assessment was conducted to determine if contaminants present in site soils and groundwater have impacted or can potentially impact flora and fauna in the area.

The site is now a vacant lot and much of the surface soil has been removed and backfilled with clean soil. Grasses and weeds have revegetated most of the Site and birds and insects have been observed on site. No endangered or threatened species have been identified in the immediate vicinity of the Site.

The risk assessment considered potential on-site ecological impacts by calculating HIs for exposure of surrogate species to on-site soil. The calculations were produced in a manner similar to the HI calculated for human exposure. Calculated potential intakes were compared to No-Observed-Adverse-Effects-Levels, Lowest-Observed-Adverse-Effects, or other toxicological data. Given the conservative assumptions used to calculate potential exposure and associated risk, the ecological risk for on-site species is not considered significant.

TABLE 6: RISK SUMMARY FOR CURRENT AND FUTURE USE: ON-SITE SOIL AND GROUNDWATER

Land Use/Receptor	Pathway	Noncarcinogenic Risk (Hazard Index)	Carcinogenic Risk
Current Use /Adolescent Trespasser	Ingestion of Soil	0.2	5×10^{-6}
	Dermal Contact with Soil	0.1	5×10^{-6}
	TOTAL:	0.3	1×10^{-5}
Future Use/ Adolescent Trespasser	Ingestion of Soil	0.2	5×10^{-6}
	Dermal Contact with Soil	0.1	5×10^{-6}
	TOTAL:	0.3	1×10^{-5}
Future Use/Adult Construction Worker	Ingestion of Soil	2.0	4×10^{-6}
	Dermal Contact with Soil	0.3	8×10^{-7}
	TOTAL:	2.3	5×10^{-6}
Future Use/Adult Worker	Ingestion of Soil	0.1	9×10^{-6}
	Dermal Contact with Soil	0.08	8×10^{-6}
	TOTAL:	0.18	2×10^{-5}
Future Use/Child Resident	Ingestion of soil	3.0	6×10^{-5}
	Dermal contact with soil	0.8	2×10^{-5}
	Ingestion of groundwater	10	2×10^{-3}
	Inhalation of groundwater	0.9	4×10^{-6}
	TOTAL:	15	2×10^{-3}
Future Use/Adult Resident	Ingestion of soil	0.4	3×10^{-5}
	Dermal Contact with Soil	0.3	3×10^{-5}
	Ingestion of groundwater	5.0	3×10^{-3}
	Inhalation of groundwater	0.4	7×10^{-6}
	TOTAL:	6.1	3×10^{-3}

TABLE 7: RISK SUMMARY FOR CURRENT AND FUTURE USE: OFF-SITE SOIL			
Land Use/Receptor	Pathway	Noncarcinogenic Risk (Hazard Index)	Carcinogenic Risk
Child Resident	Ingestion of soil	0.8	7×10^{-6}
	Dermal contact with soil	0.3	2×10^{-6}
	TOTAL:	1.1	9×10^{-6}
Adult Resident	Ingestion of soil	0.09	3×10^{-6}
	Dermal contact with soil	0.1	3×10^{-6}
	TOTAL:	0.19	6×10^{-6}

6.6 Uncertainties

At all stages of the risk assessment, conservative estimates and assumptions were made so as not to underestimate potential risk. Nevertheless, uncertainties and limitations are inherent in the risk assessment process.

The estimates of exposure point concentrations of the chemicals of concern probably overstate actual concentrations to which individuals would hypothetically be exposed and therefore, the health risk estimates are very conservative. In addition, no attenuation of the chemicals was considered; however, this may reduce concentrations of chemicals over time.

The assumed exposure pathways evaluated in the risk assessment are conservative in nature and may overstate the actual risk posed by this Site.

Summing risks or hazard indices for multiple contaminants ignores the possibility of synergistic or antagonistic activities in the metabolism of the contaminants.

7.0 DESCRIPTION OF ALTERNATIVES FOR GROUNDWATER

The following Site specific alternatives represent a range of distinct actions addressing human health and environmental concerns. The analysis presented below reflects the fundamental components of the various alternatives considered feasible for this Site.

The various alternatives were based on achieving groundwater cleanup levels. Most of these cleanup levels are based on the primary Maximum Contaminant Levels (MCLs) for drinking water. However, the cleanup levels for

ethylbenzene and xylene are based on their respective secondary MCLs. It is apparent that these two contaminants may contribute to increased mobilization of the BHC isomers. Thus, the secondary standards were considered appropriate for the protection of groundwater.

MCLs were not available for alpha-BHC, beta-BHC, and 4,4-DDD'. Therefore, groundwater cleanup levels for these contaminants were based on the State's preferred risk levels for carcinogens.

Seven alternatives were selected for detailed analysis and are listed below:

Alternative No. 1	No further action
Alternative No. 2	Natural attenuation and monitoring
Alternative No. 3	Removal, treatment, and disposal of groundwater
Alternative No. 4	Bioactive filter
Alternative No. 5	Hydrologic flow barrier
Alternative No. 6	Combined alternative
Alternative No. 7	Source removal

Alternative No. 1 - No further action: This alternative serves as a baseline with which other alternatives can be compared and includes maintenance of the existing fence and warning signs, and mowing of the grass at the site for a 30-year period. Conservative estimates of biodegradation rates indicate that ARARs for mobile contaminants will be met in approximately 10 years. However, this alternative does not include monitoring to verify the rate of degradation.

Under this alternative, no further cleanup would occur at the site. A removal action was completed on-site during 1992 and a removal action was completed at the adjacent trailer park during 1994. Groundwater at the Site is not presently consumed and poses no current risk. However, no controls would be placed on future groundwater use. Area residences and businesses are currently supplied by municipal water supply systems.

Alternative No. 2 - Natural attenuation and monitoring: Alternative No. 2 includes the implementation of regulatory or institutional controls to limit the future use of the site, and the initiation of a long-term groundwater monitoring program. This alternative relies on the natural attenuation processes and continued natural degradation to reduce contaminant concentrations. Conservative estimates of biodegradation rates indicate that ARARS for mobile contaminants will be met in approximately 10 years.

Institutional controls utilize regulatory agency procedures or deed restrictions to restrict access to or usage of contaminated groundwater. Although the surficial aquifer is not used for water supply in the vicinity of the site, deed restrictions would be placed on the site to specify that groundwater

withdrawals from the site (other than sampling to determine water quality) are restricted until the ARARs are achieved. Institutional controls would be used, as necessary, to control access to contaminated groundwater outside the Chevron property boundary. Since all residences and businesses in the vicinity of the site are supplied by the city and county municipal water supply systems, it is unlikely that the surficial aquifer will be used for water supply in the near future.

This alternative also includes a long-term monitoring program to monitor contaminant concentrations in the groundwater beneath and downgradient of the site.

Alternative No. 3 - Removal, treatment, and disposal of groundwater: This alternative consists of the installation of extraction wells (or a combination of extraction wells and horizontal wells) to remove contaminated groundwater. The contaminated groundwater would then be treated by air stripping and carbon adsorption. The treated groundwater will be discharged into on-site infiltration trenches. Numerical simulations indicate that this alternative will achieve the ARARs for all of the mobile COCs at the property boundary within 3 years. Existing information is insufficient to accurately predict the time required for groundwater to comply with ARARs at all locations across the site, but may be similar to that required for the no-action alternative (i.e., 8-10 years). Natural attenuation may be necessary to completely satisfy the cleanup levels. Contaminant concentrations may reach asymptotic levels slightly above the cleanup levels in a typical pump and treat system.

The purpose of air stripping is to bring the groundwater into contact with air so that the volatile compounds migrate from the water to air. Although the pesticides of concern generally have low Henry's law constants (i.e., are not very volatile), stripping can be enhanced by using a high air-to-water ratio to create an environment in which each compound's concentration in air is always low. Under these conditions, the system will tend toward an equilibrium condition where the concentration in the water is lowered. Vapor emission controls are required to capture the volatilized pesticides by passing the emissions through activated carbon cylinders.

Granular activated carbon (GAC) adsorption is a physical adsorption process that has been shown to be successful in reducing the concentrations of pesticides in wastewater. The groundwater is brought into direct contact with the GAC filter beds, usually two columns in series and/or parallel, to facilitate continuous operation and to allow for replacement of exhausted beds. Although disposal of spent carbon is a major expense, GAC beds designed for low pesticide concentrations can often last about 3 months before replacement is needed.

Alternative No. 4 - Bioactive filter: The bioactive filter alternative is an innovative technology that involves installation of a permeable, biologically active wall to intercept groundwater contaminants migrating off-site. The filter extends vertically from land surface to approximately 30 ft below the surface, and horizontally to encompass the downgradient boundary of the site. The filter is composed of native sand mixed with a carbon material that will selectively adsorb dissolved organic species migrating in the groundwater. The filter is designed such that COC concentrations in groundwater exiting the downgradient edge of the filter material will meet ARARs. In addition, if a natural material like peat is used for the filter, the organic compounds collected by the filter may biodegrade more rapidly when adsorbed to this more biologically active material. COC concentrations upgradient of the filter will be reduced by ongoing natural biodegradation. ARARs for organic contaminants are expected to be met downgradient of the Site within 3 years. Cleanup levels are expected to be met on-site within 10 years, similar to the timeframe associated with the natural attenuation alternatives.

Alternative No. 5 - Hydrologic flow barrier: The hydrologic flow barrier considered for this alternative is a slurry wall, which is a low-permeability barrier that will be constructed along the downgradient edges of the site. The slurry wall will decrease the flow of contaminated groundwater from the site to downgradient areas. The portion of the plume that is currently downgradient of the site will continue to degrade. Contaminant migration will be eliminated. Cleanup levels for mobile contaminants are expected to be met downgradient of the Site within 3 years. The downgradient concentrations will decrease because the flow of upgradient, on-site contamination will be greatly reduced and thus will no longer contribute to the downgradient contamination. Cleanup levels are expected to be met on-site within 10 years, similar to the timeframe associated with the natural attenuation alternatives.

Alternative No. 6 - Combined alternative: This alternative includes quarterly groundwater sampling and additional groundwater assessment. After one year, the groundwater data would be reviewed to determine if natural attenuation has reduced the levels of contaminants such as xylene and alpha-BHC by 10 to 15 percent. If those levels are achieved, then the natural attenuation and groundwater sampling would continue. If not, then the permeable filter wall (alternative 4) would be implemented along with other measures such as limited air sparging or hydraulic gradient control, or source removal, if necessary. The contingency may also be required if contaminant concentrations do not decrease as predicted during subsequent years or if contaminants are detected in monitoring well MW-11D. This alternative also includes deed restrictions to prohibit the residential use of the Chevron Site and institutional controls to prohibit the potential consumption of groundwater from the area of the contaminant plume until groundwater standards have been achieved. Cleanup levels are expected to be achieved within 8-10 years and groundwater monitoring will continue until those levels are achieved.

Alternative No. 7 - Source Removal: Under this alternative, contaminated soil that may act as a source of COCs to groundwater would be located, excavated, and transported to an approved TSD facility. Once the sources have been removed, groundwater concentrations of COCs would be expected to decrease rapidly due to natural attenuation mechanisms (i.e., biodegradation). Cleanup levels would be expected to be met within 3 years after the source has been removed. However, the locations of potential limited sources to groundwater are not known with certainty, despite extensive site investigations and soil removal actions. As a result, this remedy may still rely on natural attenuation to ultimately achieve cleanup levels and may require approximately 10 years to achieve cleanup levels.

This alternative would likely be combined with any of the alternatives 2-6, if necessary, to achieve an effective cleanup.

8.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The alternatives are evaluated against one another by using the following nine criteria:

- Overall protection of human health and the environment.
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
- Long term effectiveness and permanence.
- Reduction of toxicity, mobility, or volume through treatment.
- Short term effectiveness.
- Implementability.
- Costs.
- State Acceptance.
- Community Acceptance.

The NCP categorized the nine criteria into three groups:

- (1) **Threshold criteria:** the first two criteria, overall protection of human health and the environment and compliance with ARARs (or invoking a waiver), are the minimum criteria that must be met in order for an alternative to be eligible for selection
- (2) **Primary balancing criteria:** the next five criteria are considered primary balancing criteria and are used to weigh major trade-offs among alternative cleanup methods
- (3) **Modifying criteria:** state and community acceptance are modifying criteria that are formally taken into account after public comment is received on the proposed plan. Community acceptance is addressed in the

responsiveness summary of the ROD.

The comparative analysis of the seven alternatives proposed for this Site are presented in the following section.

8.1 Comparative Analysis of Remedial Alternatives

1. Overall Protection of Human Health and the Environment

Each alternative, except for the no-action alternative, would provide protection of human health and the environment given the current conditions at the Site. Removal actions to address contaminated soil have been completed at the Site and the adjacent trailer park. The groundwater within the surficial aquifer beneath and downgradient of the site is not currently used as a potable, irrigation, or industrial supply. Potable water is provided to surrounding residents and businesses by the City of Orlando and Orange County municipal water supply systems. The groundwater in the surficial aquifer is not currently being used, and the plume is at steady state. Therefore, there is no risk to human health or the environment associated with the groundwater in its current condition. There is potential future risk if a private drinking water well was installed in the area of the plume before the contaminants had degraded.

2. Compliance with ARARs

Each alternative is expected to comply with federal and state ARARs for groundwater contaminants. It is expected that the various alternatives will achieve compliance with groundwater ARARs within 8-10 years. However, alternative 1, would not provide the necessary monitoring to verify the expected degradation of contaminants. The ARARs include federal and state MCLs for drinking water. State guidance concentrations or federal action levels are used for contaminants that do not have MCLs.

3. Long-Term Effectiveness and Permanence

The long-term effectiveness of all of the alternatives, except the no-action alternative, is similar. All alternatives will eventually result in reduction of contaminant concentrations to achieve cleanup levels. Alternatives 3, 4, and 6 reduce the toxicity, mobility, and volume of contaminants through treatment. Continued groundwater monitoring will provide the additional data to refine the predictions of the time required for the selected alternative to achieve the cleanup levels.

4. Reduction of Toxicity, Mobility, or Volume

Alternatives 3 and 4 (and possibly 6) reduce the toxicity, mobility, and

volume of contaminants through treatment. Alternative 5, which involves a physical barrier, will reduce the mobility of contaminants and also indirectly reduce the toxicity and volume. Alternatives 1 and 2 will reduce the toxicity, mobility, and volume of contaminants by natural attenuation.

5. Short-Term Effectiveness

Those alternatives that require disruption of on-site soils (Alternatives 3, 4, 5, 7, and possibly 6) pose a greater short-term risk to site workers and adjacent residents than the no action and natural attenuation alternatives. The trench construction alternatives also pose a greater risk to site workers due to the use of heavy equipment and high-pressure hydraulic systems.

Alternatives 1, 2 and 6 may result in satisfaction of cleanup levels within 8-10 years. Alternatives 3, 4, 5, and 7 may result in satisfaction of cleanup levels for the organic contaminants within 2 to 3 years at the north boundary and downgradient of the site. However, it may still take 8-10 years for cleanup levels to be met at the Site.

6. Implementability

All alternatives are technically implementable. Alternative No. 3—groundwater extraction, treatment, and disposal—requires pilot testing and long-term operation and maintenance and is therefore more difficult to implement. The Soil Saw, which may be used for Alternatives 4, 5, and possibly 6, is an innovative technology, and is currently available only through Brown and Root. However, conventional trenching technology can be used to implement these alternatives.

7. Cost

The net present value (NPV) cost estimates for the alternatives range from \$92,200 for the no action alternative, to \$3,553,800 for groundwater recovery and treatment. The cost estimates are approximate.

TABLE 8: COST COMPARISON OF CLEANUP ALTERNATIVES			
Groundwater Alternative.	Capital Costs	Annual Operation & Maintenance (O&M)	Total Cost (based Present Worth)
1 - No Action	\$ 0	\$ 6,000	\$ 92,000

TABLE 8: COST COMPARISON OF CLEANUP ALTERNATIVES			
2 - Natural Attenuation and Monitoring	\$10,000	\$17,160	\$247,700
3 - Pump and Treat	\$ 583,800	\$193,200	\$3,553,800
4 - Bioactive Filter Wall	\$ 1,053,100	\$ 17,510	\$ 1,316,900
5 - Hydrologic Flow Barrier	\$1,610,000	\$ 17,610	\$1,873,800
6 - Alternative 2 with Alternative 4 as contingency*	\$10,000	\$17,160	\$247,000
	\$1,053,000	\$17,160	\$1,316,900
7 - Excavation of source material	\$1,035,000	\$17,200	\$1,558,200
*Costs are shown here both without the contingency and with the contingency.			

8. Community Acceptance

Based on the responses received during the public comment period, the community accepts the selected remedy.

9. State Acceptance

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the Remedial Investigation (RI) and Feasibility Study (FS) process for the Chevron Chemical Company Site. In accordance with 40 CFR 300.430, FDEP, as the support agency, has provided input during the RI/FS process. FDEP agrees with the groundwater remedy, but does not agree with no further action for soil. FDEP is unwilling to concur with the ROD because the State would prefer a risk level no greater than 1×10^{-6} . The potential risk associated with future residential exposure at the adjacent trailer park is 9.0×10^{-6} . The potential risk associated with future commercial exposure at the Site is 2.0×10^{-5} .

9.0 SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, EPA has selected a remedy for groundwater at this Site. At the conclusion of the

remedy, the potential risk associated with exposure to groundwater at the Site will be in the range 10^{-5} to 10^{-6} . EPA considers these risk levels to be protective of human health and the environment as they fall within EPA's risk range and are based on an EPA approved site specific risk assessment. The total present worth cost of the selected remedy, Alternative No. 6, is estimated at \$247,000. The cost will increase to approximately \$1.3 million if the contingency plan is implemented.

EPA has determined that no further action is necessary for soil at the Site. The potential risk associated with current or future commercial exposure at the Site is 2.0×10^{-5} . The potential risk associated with future residential exposure at the adjacent trailer park is 9.0×10^{-6} . EPA considers these risk levels to be protective of human health and the environment as they fall within EPA's risk range and are based on an EPA approved site specific risk assessment. However, on September 29, 1995, FDEP issued guidance suggesting soil cleanup goals which are based on a risk level of 1×10^{-6} . Attainment of the more stringent risk level may be necessary to obtain FDEP's concurrence with deletion of this Site from the National Priorities List in the future.

The remedy for groundwater is summarized in the following items:

1. Deed restrictions/notices or institutional controls to prohibit consumption of contaminated groundwater until the cleanup standards have been met.
2. routine maintenance of the Site including fence maintenance, grass mowing, etc.
3. natural attenuation of contaminants in groundwater and quarterly groundwater monitoring.
4. a contingency plan which includes the installation of a subsurface filter wall. Events that would trigger the contingency are detailed below.

A. Deed Restrictions or Institutional Controls and Site Maintenance

Deed restrictions or institutional controls are intended to prohibit consumption of contaminated groundwater until the cleanup standards have been achieved.

Site maintenance includes those routine tasks such as fence maintenance, grass mowing, etc. Site maintenance shall be conducted for up to 30 years or until cleanup levels are achieved, whichever comes first.

B. Groundwater Remediation

B.1. The major components of groundwater remediation to be implemented include:

- Natural degradation and/or attenuation of groundwater contaminants
- Groundwater monitoring to document the expected reduction in contaminant concentrations and to evaluate potential contaminant migration.
- A contingency plan which includes the installation of a subsurface filter wall. Other measures such as limited air sparging, hydraulic gradient control, or source removal, would be implemented as necessary. The contingency would be invoked if one of the following conditions is met:
 - contaminant concentrations do not decrease by 10-15% within one year.
 - contaminant concentrations in subsequent years do not decrease as expected.
 - organic contaminants are detected in monitoring well MW-11 or MW-15.

The groundwater monitoring program will initially consist of quarterly monitoring during the first year. The monitoring program will also include additional groundwater assessment. This assessment will include the installation of additional monitoring wells as necessary to further define the extent of the groundwater contamination.

If, after one year, there is a 10 to 15% reduction in contaminant concentrations, then a new model for natural attenuation will be developed based upon the available groundwater sampling data. Future contaminant reduction by natural attenuation will be evaluated relative to the predicted reductions of the new natural attenuation model.

If contaminant concentrations are not reduced by 10-15% within one year, then the subsurface filter wall will be installed. Additional enhancements, such as limited air sparging, hydraulic gradient control, or source removal will be implemented as necessary. The contingency may also be required if future monitoring data does not continue to demonstrate contaminant reduction as predicted by the attenuation model.

The degree of contaminant attenuation will be measured relative to the concentrations in groundwater samples collected in April 1995. The initial one year sampling period will begin with the first sampling event conducted subsequent to the April 1995 sampling event.

The focus of this groundwater remedy is upon the BETX compounds (benzene, ethylbenzene, and xylene) and the pesticides. Therefore, it may not be necessary to analyze for total naphthalenes and metals as frequently as the other contaminants. Total naphthalenes and arsenic were detected below their associated cleanup levels during the last sampling event. Chromium was detected above its cleanup level in one well, located off-site. Lead was detected sporadically on site and around the Site.

In addition, it is possible there may be other, off-site sources of some groundwater contaminants. The groundwater sampling data should be reviewed for evidence of contaminant migration to the Site from off-site sources.

The groundwater monitoring will continue until groundwater cleanup standards have been achieved for two consecutive monitoring periods. EPA, in consultation with FDEP, will conduct an annual review the groundwater monitoring data to evaluate the effectiveness of this remedy. Other actions may be implemented, if necessary.

C. Compliance Testing

Groundwater samples will be collected and analyzed for the parameters listed in the table below.

TABLE 9: COMPLIANCE MONITORING			
GROUNDWATER CONTAMINANT	CLEANUP STANDARD (ug/l)		CLEANUP STANDARD (ug/l)
Benzene	1 ¹	b-BHC	0.1 ⁴
Ethylbenzene	30 ²	g-BHC (Lindane)	.2 ¹
Xylenes	20 ²	Chlordane	2 ¹
Total naphthalenes	100 ³	Arsenic	50 ¹
4,4-DDD	0.1 ⁴	Chromium	100 ¹
a-BHC	0.05 ⁴	Lead	15 ⁵

TABLE 9: COMPLIANCE MONITORING

1	Primary MCL
2	Secondary MCL
3	State target level
4	State Guidance Concentration
5	Federal action level

10. STATUTORY DETERMINATIONS

EPA has determined that the selected remedy will satisfy the statutory determinations of Section 121 of CERCLA. The remedy will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will use permanent solutions and alternative treatment technologies to the maximum extent practicable.

10.1 Protection of Human Health and The Environment

This remedy is protective of human health and the environment due to several factors. First, removal actions have reduced soil contaminants to levels that will not contribute to an unacceptable risk given future commercial use of the Site or continued residential use of the trailer park. Secondly, groundwater contaminants will naturally degrade and/or attenuate to levels that comply with groundwater cleanup levels. Finally, there are no private wells located in the area of groundwater contamination and State law restricts installation of new wells in areas of known contamination.

10.2 Compliance with ARARs

Implementation of this remedy will comply with all federal and State ARARs and will not require a waiver. This remedy will comply with the ARARs that are listed Table 10.

TABLE 10: ARARS

LOCATION SPECIFIC		
	Citation	Location/Description
A	•Florida Administrative Code 62-524 and Florida Statute 373.309	Areas of known contamination. Regulatory clearance required to use potable water wells in area of known contamination.

A	•Florida Administrative Code 62-736	Hazardous waste sites. Requires use of warning signs to inform public of potentially harmful conditions at sites.
CHEMICAL-SPECIFIC AND ACTION-SPECIFIC		
SAFE DRINKING WATER ACT - 40 USC Section 300		
A	40 CFR Part 141 - National Primary Drinking Water Standards	Establishes maximum contaminant levels (MCLs) which are health-based standards for public water systems.
STATE ARARS		
R & A	FAC 62-550	State of Florida Primary Drinking Water Standards
TO BE CONSIDERED (TBC)		
	FAC 62-550	State of Florida Secondary Drinking Water Standards
	FAC 62-770.730	State of Florida Petroleum Contamination Site Cleanup Criteria.
	June 21, 1990 Memorandum from U.S EPA OERR/OWPE	Action level for lead in drinking water. Established by U.S. EPA
	1994 Florida Groundwater Guidance Concentrations	State of Florida minimum criteria that consider potential carcinogenic or toxic effects for contaminants in groundwater
<p>A = APPLICABLE REQUIREMENTS WHICH WERE PROMULGATED UNDER FEDERAL LAW TO SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION LOCATION OR OTHER CIRCUMSTANCE AT THE SITE.</p> <p>R & A = RELEVANT AND APPROPRIATE REQUIREMENTS WHICH WHILE THEY ARE NOT 'APPLICABLE' TO A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCE AT THE SITE, ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT THE SITE THAT THEIR USE IS WELL SUITED TO THE SITE.</p> <p>1 = CHEMICAL-SPECIFIC REQUIREMENT 2 = ACTION-SPECIFIC REQUIREMENT</p>		

10.3 Cost-Effectiveness

The selected remedy, Alternative 6, is a cost effective remedy. The selected remedy includes natural attenuation and monitoring and a contingency remedy which includes a subsurface filter wall. The total estimated present worth cost of this alternative is approximately \$247,000 which includes capital costs and annual operation and maintenance costs. The costs increase to approximately \$1.3 million if the contingency is implemented. EPA has determined that the cost of implementing the remedy is proportionate to the overall effectiveness of the remedy and is a reasonable value.

10.4 Use of Permanent Solutions and Treatment Technologies

- The selected remedy uses permanent solutions and treatment technologies to the maximum extent practicable. Natural attenuation is expected to

permanently achieve the groundwater cleanup standards within a reasonable timeframe of 8-10 years.

10.5 Preference for Treatment as a Principal Element

This remedy does not satisfy the statutory preference for treatment as a principal element. However, the groundwater contaminants are expected to naturally degrade and/or attenuate within 8-10 years.

11. DOCUMENTATION OF SIGNIFICANT CHANGES

The remedy described in this Record of Decision is the preferred alternative described in the Proposed Plan for this Site. There have been no significant changes in the selected remedy.

APPENDIX A: RESPONSIVENESS SUMMARY

APPENDIX A: RESPONSIVENESS SUMMARY
CHEVRON NPL SITE

1. One person was concerned that contaminants may have been carried by surface water drainage along paths that have not been investigated. The drainage paths includes a portion of the Armstrong Trailer Park plus an area that starts near the railroad track to the west of the Chevron property.

RESPONSE: The transport of contaminants via surface water drainage from the Chevron property across the Armstrong Trailer Park has been addressed. The Removal Action Report, dated July 1994, summarizes the soil sampling conducted across the trailer park and the subsequent soil removal. Figure 1-2 shows the location of soil samples collected throughout the trailer park. Figure 2-2 shows the extent of contaminated soil which required removal from the trailer park.

The sampling results indicate that the extent of contamination was well defined and that no further soil removal is necessary in the trailer park.

Concerns about other drainage paths are addressed by various drainage studies conducted at the Site. A surface and groundwater hydrology evaluation was prepared in March 1995 and is part of the administrative record for this Site. The evaluation confirmed that surface water drainage across the Site is predominantly to the northwest corner of the Site. An earlier drainage evaluation was conducted at the Site during 1991. Surface elevations measured at various locations across the Site indicate that the surface water would have drained to northwest corner of the Site.

Some localized surface water may have drained along the railroad tracks located south and west of the Site. This surface water drainage would have been limited to the immediate area around the railroad tracks. The drainage is not likely to have included surface water from most of the Site, as explained above.

2. One person asked if dust generated during the 1992 removal could have affected him at his workplace across North Orange Blossom Trail.

RESPONSE: No. Air sampling was conducted during the removal and no excessive levels were detected. The cleanup workers wore protective equipment, including respirators, because they were so close to the disturbed soil. In addition, the cleanup workers wear protective equipment because they are subject to frequent exposures from working at many different sites.

3. One person recommended alternative one, no further action. The person noted that if no one is drinking the water and the contaminants are expected to degrade naturally, then the government should not spend more money at the Site.

RESPONSE: It is correct that no one is drinking the groundwater and that the contaminants are expected to degrade naturally. However, it is necessary to spend some money to collect groundwater samples to confirm that degradation occurs as expected. The government will not pay for the sampling. Chevron will conduct the sampling and will be supervised by EPA.

4. One person was concerned that no baseline was established to measure the required 10-15% reduction during the first year. The person also questioned what would happen if some contaminants decline as required, but others do not decline.

RESPONSE: The first year of additional monitoring data will be compared to results for samples collected during April 1995.

The focus of this groundwater remedy is upon benzene, ethylbenzene, xylene and the pesticides. These contaminants were the most frequently detected (and apparently mobile) contaminants in the groundwater. Statistical analyses of all available groundwater data may be useful to evaluate the degradation of contaminants.

5. FDEP stated that the potential risk levels associated with current or future use of the Site exceed FDEP's target risk of 10^{-6} .

RESPONSE: EPA is aware of FDEP's long standing preference for attaining risk no greater than 10^{-6} for carcinogens. However, at this Site, the risk assessment does not support further action for soil to achieve a target risk of 10^{-6} . The Superfund provides EPA with flexibility in developing remediation goals which attain risk between 10^{-4} to 10^{-6} . Use of a risk range is a necessary process to account for factors such as toxicological uncertainty and/or confidence. FDEP's preference was also factored into the risk management process prior to the determination that no further action was necessary for soil. The potential risk associated with exposure to soil at the Site is already within EPA's risk range. Therefore, no further action for soil is necessary.

6. One person stated that ethylbenzene and xylene have minimal co-solvency effects, particularly at the current concentrations, and do not contribute to the migration of pesticides in groundwater. Therefore, the issue of co-solvency is not relevant in the decision to use the lower secondary groundwater standards for ethylbenzene and xylene as cleanup

standards.

RESPONSE: There is site specific evidence that suggests the synchronous movement of solvents and pesticides in groundwater. The sampling data show that generally, the concentrations of BHC pesticides are elevated in the same wells where the organic solvents are elevated.

7. One person stated that the secondary groundwater standards for ethylbenzene and xylene are based on odor. These standards are much lower than the primary groundwater standards which are based on protection of human health. Therefore, if EPA intends to use odor based standards, then it must establish background odor standards and adjust the cleanup standards accordingly.

The person also stated that the cleanup standards for 4,4'-DDD, α -BHC, and β -BHC are state guidance concentrations, not groundwater or drinking water standards. Therefore, these standards are to be considered by EPA, but are not ARARs.

Finally, the person noted that language in Florida code 62-520.520 exempts a facility from compliance with secondary standards. The exemption may be applied if the installation discharged to groundwater prior to July 1982 and if the installation operated consistently with regulations related to the discharge at the time of the operation.

RESPONSE: Secondary standards are based on aesthetic qualities relating to the public acceptance of drinking water. In addition, the State of Florida encourages the use of secondary standards to prevent the impairment of potential drinking water supplies.

The Florida secondary standard for odor from groundwater is 3, the odor threshold number. This specific secondary standard for odor is not used as a basis to evaluate the groundwater alternatives at this Site.

The cleanup standards for 4,4'-DDD, α -BHC, and β -BHC are defined as "To Be Considered" (TBC) in Section 10 of this ROD. These standards are based on carcinogenic health based data. The secondary standards for ethylbenzene and xylene are also defined as TBC. Guidelines defined as TBC may be used in the remedy selection process.

Finally, given the available data, it is apparent that the use of secondary groundwater standards will not increase the timeframe required to achieve groundwater cleanup. The timeframe for overall groundwater cleanup was estimated at 8-10 years due to the time necessary to achieve compliance with the primary standard for benzene. EPA has recalculated selected individual contaminant degradation rates using the secondary

standards for ethylbenzene and xylene and the state guidance concentrations for the BHC compounds. These standards were coupled with the April 1995 groundwater contaminant concentrations in the biodegradation model. The results indicate that the timeframes required to comply with these secondary standards should still be less than the expected overall cleanup timeframe.

8. One person noted that metals detected in groundwater at the site are not site related. In addition, if there are off-site sources of metals that are not addressed, then the concentrations found at the Site may not decline with time. Therefore, metals should not be included as cleanup levels that must be met at the Site. In addition, upgradient, off-site sources of petroleum should be addressed because they are impacting groundwater at the Site.

RESPONSE: There was a documented case of an acid spill in the vicinity of the western rinsate pond. Soil from the affected area was excavated and disposed offsite. However, it is possible that the low pH of the acid did temporarily increase the mobility of metals from soil to groundwater. Therefore, it is possible that the presence of metals in groundwater is related to site activities.

EPA agrees that the groundwater sampling data should be reviewed for indications of off-site contamination migrating to the Site. Also, see the response to comment #8 below.

9. One person noted that the estimated costs for groundwater monitoring presented in the FS were based on purgeable aromatic compounds and chlorinated pesticides only. The addition of naphthalenes, arsenic, chromium, and lead will triple the testing costs for each sample, thus impacting the cost effectiveness of the remedy.

RESPONSE: The monitoring costs in the FS considered a worst case scenario of sampling for thirty years. A more realistic monitoring period is ten years, given that cleanup levels should be achieved within that timeframe. Thus, the additional costs associated with analyzing several additional contaminants will be more than offset by the expected shorter duration of sampling.

Nevertheless, the focus of this groundwater remedy is upon the BETX compounds (benzene, ethylbenzene, and xylene) and the pesticides. Therefore, it may not be necessary to analyze for total naphthalenes and metals as frequently as the other contaminants. Total naphthalenes and arsenic were detected below their associated cleanup levels during the last sampling event. Chromium was detected above its cleanup level in one well, located off-site. Lead was detected sporadically on site and around the Site.

Appendix 2
SOW

APPENDIX B
STATEMENT OF WORK

REMEDIAL DESIGN/REMEDIAL ACTION
CHEVRON CHEMICAL COMPANY, INC. SUPERFUND SITE
ORANGE COUNTY, FLORIDA
EPA - REGION IV

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STATEMENT OF WORK FOR THE
REMEDIAL DESIGN AND REMEDIAL ACTION
AT THE CHEVRON CHEMICAL SITE

I. INTRODUCTION

This Statement of Work (SOW) outlines the Work to be performed by the Respondent at the Chevron Chemical Superfund Site in Orange County, Florida ("the Site"). The work outlined is intended to fully implement the remedy as described in the Record of Decision (ROD) for the Site, dated May 22, 1996, and to achieve the Performance Standards set forth in the ROD, Unilateral Administrative Order (UAO), and this SOW. The requirements of this SOW will be further detailed in work plans and other documents to be submitted by the Respondent for approval as set forth in this SOW. It is not the intent of this document to provide task specific engineering or geological guidance. The definitions set forth in Section III of the UAO shall also apply to this SOW unless expressly provided otherwise herein.

The Respondent is responsible for performing the Work to implement the selected remedy. EPA shall conduct oversight of the Respondent's activities throughout the performance of the Work. The Respondent shall assist EPA in conducting oversight activities.

EPA review or approval of a task or deliverable shall not be construed as a guarantee as to the adequacy of such task or deliverable. If EPA modifies a deliverable pursuant to Section XIII of the UAO, such deliverable as modified shall be deemed approved by EPA for purposes of this SOW. A summary of the major deliverables that the Respondent shall submit for the Work is attached.

The selected remedy includes natural attenuation and monitoring of groundwater contaminants. Groundwater monitoring has been conducted at the Site by the Respondent since 1991. The groundwater monitoring should continue in an equivalent manner (see Section IV, Part 1 and Section V).

The selected remedy also includes a contingency. If EPA determines that the contingency must be implemented, then the Respondent shall submit the deliverables described in the "contingency SOW" (see Section IV, Part 2 and Section V).

II. OVERVIEW OF THE REMEDY

THE OBJECTIVES OF THIS REMEDIAL ACTION ARE TO:

- Minimize the continued release of hazardous substances, pollutants and contaminants to the aquifer;

- Reduce to protective levels the risks to human health associated with direct contact with hazardous substances, pollutants or contaminants within the Site;
- Reduce to protective levels the risks to human health from inhalation of hazardous substances, pollutants or contaminants from the Site;
- Eliminate or minimize the threat posed to human health and the environment from current and potential migration of hazardous substances in the surface water, ground water, and subsurface and surface soil and rock at the Site;
- Reduce concentrations of hazardous substances, pollutants and contaminants in ground water, surface and subsurface soil within the Site to levels specified by the Performance Standards; and
- Reduce the volume, toxicity and mobility of hazardous substances, pollutants or contaminants, preferably through treatment at the Site.

III. REMEDY

The remedy includes natural attenuation and monitoring of groundwater contaminants, deed restrictions, a contingency remedy. The contingency remedy includes a subsurface filter wall and/or other appropriate measures. The remedy is more fully described in the ROD.

A. Components

The major components of the remedy are described in Section 9.0 (A) and 9.0(B), Selected Remedy section of the attached ROD.

B. Treatment

The treatment technologies for the remedy are described in Section 9.0(A) and 9.0(B), Selected Remedy section of the attached ROD.

C. Performance Standards

The Respondent shall meet all Performance Standards, as defined in the UAO including the standards set forth in the attached ROD.

The Respondent shall operate the treatment systems until the Respondent have demonstrated compliance with the Performance Standards, in accordance with the Performance Standards Verification Plan.

D. Compliance Testing

The Respondent shall perform compliance testing to ensure that all Performance Standards are met. The impacted media shall be tested in accordance with the Performance Standard Verification Plan developed pursuant to Task V of this SOW. After demonstration of compliance with Performance Standards, the Respondent shall monitor the Site for two years. If monitoring indicates that the Performance Standards set forth in Sections 9.0(A) and 9.0(B) of the ROD are not being achieved, then EPA will reevaluate the effectiveness of the remedy.

IV. PLANNING AND DELIVERABLES

PART 1: Selected Remedy SOW

The Respondent shall implement the selected remedy as described in the Record of Decision in accordance with the terms of this Unilateral Administrative Order. The Respondent shall also comply with other performance standards that may be identified by EPA during the RD/RA phase of this project.

Initially, the Respondent shall submit a RD/RA work plan, for EPA review and approval, which includes the following items:

- A brief description of the Site including the geographic location and the physiographic, hydrologic, geologic, demographic, ecological, and natural resource features;
- A brief synopsis of the history of the Site including a summary of past disposal practices and a description of previous responses that have been conducted by local, State, Federal, or private parties; and a description of the selected remedy.
- A summary of the existing data for the contaminants identified at the Site.
- A description of tasks to be performed during the RD/RA including:
 1. periodic groundwater sampling
 2. modeling of contaminant migration and degradation time frames
 3. implementation of institutional controls/deed restrictions
 4. periodic evaluation of and reporting on the effectiveness of natural attenuation of groundwater contaminants
- identification of the monitoring wells to be sampled per event, the contaminants to be analyzed per event, and

the associated detection limits.

- schedule of tasks to be conducted during the RD/RA
- reference to and list of the existing EPA approved workplans regarding groundwater sampling including field sampling plans and health and safety plans
- transmittal of Quality Assurance Project Plan from any new laboratories that will perform sample analyses

The Respondent shall then implement the RD/RA work plan as approved by EPA. The Respondent shall also conduct the work noted in Tasks III-V, as directed by EPA.

Part 2 : Contingency Remedy SOW

The specific scope of this work shall be documented by the Respondent in a Remedial Design (RD) Work Plan and a Remedial Action (RA) Work Plan. Plans, specifications, submittals, and other deliverables shall be subject to EPA review and approval or comment in accordance with Section XIII of the UAO and as noted in the Summary of the Major Deliverables attached hereto.

The Respondent shall submit a technical memorandum documenting any need for additional data along with the proposed Data Quality Objectives (DQOs) whenever such requirements are identified. The Respondent are responsible for fulfilling additional data and analysis needs identified by EPA during the RD/RA process consistent with the general scope and objectives of the UAO, including this SOW.

The Respondent shall perform the following tasks:

TASK I - PROJECT PLANNING

A. Site Background

The Respondent shall gather and evaluate the existing information regarding the Site and shall conduct a visit to the Site to assist in planning the RD/RA as follows:

1. Collect and Evaluate Existing Data and Document the Need for Additional Data

Before planning RD/RA activities, all existing Site data shall be thoroughly compiled and reviewed by the Respondent. Specifically, this shall include the ROD, RI/FS, and other available data related to the Site. This information shall be utilized in determining additional data needed for RD/RA implementation. Final decisions on the necessary data and DQOs shall be made by EPA.

2. Conduct Site Visit

If deemed necessary by EPA, the Respondent shall conduct a visit to the Site with the EPA Remedial Project Manager (RPM) during the project planning phase to assist in developing a conceptual understanding of the RD/RA requirements for the Site. Information gathered during this visit shall be utilized to plan the project and to determine the extent of the additional data necessary to implement the RD/RA.

B. Project Planning

Once the Respondent have collected and evaluated existing data and have conducted a visit to the Site (if necessary), the specific project scope shall be planned. The Respondent shall, if deemed necessary by EPA, meet with EPA at the completion of this evaluation regarding the following activities and before proceeding with Task II.

TASK II - REMEDIAL DESIGN

The Remedial Design shall provide the technical details for implementation of the Remedial Action in accordance with currently accepted environmental protection technologies and standard professional engineering and construction practices. The design shall include clear and comprehensive design plans and specifications.

A. Remedial Design Planning

Within 45 days of EPA's authorization to proceed, the Respondent shall submit an RD Work Plan, a Sampling and Analysis Plan, a Health and Safety Plan, and a Preliminary Design to EPA. The RD Work Plan and the Sampling and Analysis Plan must be reviewed and approved by EPA and the Health and Safety Plan reviewed and commented on by EPA prior to the initiation of field activities. Upon approval of the RD Work Plan, the Respondent shall implement the RD Work Plan in accordance with the design management schedule contained therein. Plans, specifications, submittals, and other deliverables shall be subject to EPA review and approval in accordance with Section XIII of the UAO. Review and/or approval of design submittals only allows The Respondent to proceed to the next step of the design process. It does not imply acceptance of later design submittals that have not been reviewed, nor that the remedy, when constructed, will meet Performance Standards.

1. RD Work Plan

The Respondent shall submit a Remedial Design (RD) Work Plan to EPA for review and approval. The Work Plan shall be developed in conjunction with the Sampling and Analysis Plan, the Health and Safety Plan, and the Treatability Study Work Plan, although each plan may be delivered under separate cover. The Work Plan shall include a comprehensive description of the additional data collection and evaluation activities to be performed, if any, and the plans and specifications to be prepared. A comprehensive design management schedule for completion of each major activity and submission of each deliverable shall also be included.

Specifically, the Work Plan shall present the following:

- a. A statement of the problem(s) and potential problem(s) posed by the Site and the objectives of the RD/RA.
- b. A background summary setting forth the following:
 - 1) A brief description of the Site including the geographic location and the physiographic, hydrologic, geologic, demographic, ecological, and natural resource features;
 - 2) A brief synopsis of the history of the Site including a summary of past disposal practices and a description of previous responses that have been conducted by local, State, Federal, or private parties;
 - 3) A summary of the existing data including physical and chemical characteristics of the contaminants identified and their distribution among the environmental media at the Site.
- c. A list and detailed description of the tasks to be performed, information needed for each task, information to be produced during and at the conclusion of each task, and a description of the work products that shall be submitted to EPA. This description shall include the deliverables set forth in the remainder of Task II.

- d. A schedule with specific dates for completion of each required activity and submission of each deliverable required by the UAO and this SOW. This schedule shall also include information regarding timing, initiation and completion of all critical path milestones for each activity and/or deliverable. The schedule shall provide for the timely submittal of other deliverables prior to the Final Design and shall provide sufficient time for EPA review of the deliverables.
- e. A project management plan, including a data management plan, and provision for monthly reports to EPA, and meetings and presentations to EPA at the conclusion of each major phase of the RD/RA. The data management plan shall address the requirements for project management systems, including tracking, sorting, and retrieving the data along with an identification of the software to be used, minimum data requirements, data format and backup data management. The plan shall address both data management and document control for all activities conducted during the RD/RA.
- f. A description of the community relations support activities to be conducted during the RD. At EPA's request, the Respondent will assist EPA in preparing and disseminating information to the public regarding the RD work to be performed.

2. Sampling and Analysis Plan

The Respondent shall prepare a Sampling and Analysis Plan (SAP) to ensure that all sample collection and analytical activities throughout the RD/RA (RD, Treatability Study, RA, Performance Standards Verification, etc.) are conducted in accordance with technically acceptable protocols and that the data generated will meet the DQOs established. The SAP shall include a Field Sampling and Analysis Plan (FSAP) and a Quality Assurance Project Plan (QAPP).

The FSAP shall define in detail the sampling and data-gathering methods that shall be used on the project. It shall include sampling objectives, sample location (horizontal and vertical) and frequency, sampling equipment and procedures, and sample handling and analysis. The Field Sampling and Analysis Plan shall be written so that a field

sampling team unfamiliar with the Site would be able to gather the samples and field information required. The QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that shall be used to achieve the desired DQOs. The DQOs shall, at a minimum, reflect use of analytical methods for obtaining data of sufficient quality to meet National Contingency Plan requirements as identified at 300.435 (b). In addition, the QAPP shall address personnel qualifications, sampling procedures, sample custody, analytical procedures, and data reduction, validation, and reporting. These procedures must be consistent with the Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual and the guidances specified in Section XV of the UAO.

The Respondent shall demonstrate in advance and to EPA's satisfaction that each laboratory it may use is qualified to conduct the proposed work and meets the requirements specified in Section XV of the UAO. EPA may require that The Respondent submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment and material specification, and laboratory analyses of performance samples (blank and/or spike samples). In addition, EPA may require submittal of data packages equivalent to those generated by the EPA Contract Laboratory Program (CLP).

3. Health and Safety Plan

A Health and Safety Plan shall be prepared in conformance with The Respondent's health and safety program, and in compliance with OSHA regulations and protocols. The Health and Safety Plan shall include a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and provisions for site control. EPA will not approve The Respondent's Health and Safety Plan, but rather EPA will review it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment.

4. Treatability Study Work Plan

As directed by EPA, the Respondent shall submit the Treatability Study Work Plan to EPA for review and approval. The Work Plan shall specify how the

Treatability Study will be designed and conducted in order to confirm that the selected remedy will attain all Performance Standards. As provided in the ROD, the Treatability Study Work Plan shall describe the technology to be tested, and test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for the treatability study shall be documented as well. The Treatability Study Work Plan shall describe full-scale plant installation and start-up, full-scale plant operation and maintenance procedures, and operating conditions to be tested. If testing is to be performed off-site, permitting requirements shall be addressed. A schedule for performing the treatability study shall be included with specific dates for the tasks, including, but not limited to, the procurement of contractors and the completion of sample collection, performance, sample analysis, and report preparation. The Work Plan shall describe in detail the treatment process and how the vendor or technology will meet the Performance Standards for the Site. Review and subsequent approval by EPA shall mean only that EPA considers the technology, vendor, and study approach appropriate for the remedy selected for the Site. The Treatability Study Work Plan shall also address how the Respondent propose to meet all discharge requirements for any and all treated material, air, water and expected effluents. Additionally, the Work Plan shall also explain the final treatment and disposal of all material generated by the treatment system. Any and all permitting requirements shall also be addressed.

B. Draft Design

The draft design shall represent the completion of approximately 95 percent of the design effort. Any value engineering recommendations adopted by the Respondent shall be summarized in a report submitted with the Draft Design. The Draft Design shall be submitted in accordance with the approved design management schedule. EPA approval of the Draft Design is required before proceeding with further design work, unless specifically authorized or directed by EPA. The Draft Design shall consist of the following:

1. Results of Data Acquisition Activities

Data gathered during the project planning phase shall be compiled, summarized, and submitted along with an...

analysis of the impact of the results on design activities. In addition, surveys conducted to establish topography, rights-of-way, easements, and utility lines shall be documented. Utility requirements and acquisition of access, through purchases or easements, that are necessary to implement the RA shall also be discussed.

2. Design Criteria Report

The concepts supporting the technical aspects of the design shall be defined in detail and presented in this report. Specifically, the Design Criteria Report shall include the preliminary design assumptions and parameters, including:

- a. Waste characterization
- b. Pretreatment requirements
- c. Volume of each media requiring treatment
- d. Treatment schemes (including all media and by-products)
- e. Input/output rates
- f. Influent and effluent qualities
- g. Materials and equipment
- h. Performance Standards
- i. Long-term monitoring requirements (including the implementation of deed restrictions/institutional controls)

3. Plan for Satisfying Permitting Requirements

All activities must be performed in accordance with the requirements of all applicable federal and state laws and regulations. Any off-site disposal shall be in compliance with the policies stated in the Procedure for Planning and Implementing Off-site Response Actions (Federal Register, Volume 50, Number 214, November, 1985, pages 45933 - 45937) and Federal Register, Volume 55, Number 46, March 8, 1990, page 8840, and the National Contingency Plan, Section 300.440. The plan shall identify the off-site disposal/discharge permits that are required, the time required to process the permit applications, and a schedule for submittal of the permit applications.

4. Treatability Study Final Report

Concurrent with the submittal of the draft design, the Respondent shall submit a report on the performance of the treatment technology to EPA for review and approval. The study results shall indicate clearly the performance of the treatment technology or vendor compared with the Performance Standards established for the Site. The

report shall evaluate the treatment technology's effectiveness, implementability, cost, and actual results as compared with predicted results. The report shall also evaluate full-scale application of the treatment technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation. The study results shall be submitted to EPA immediately upon completion of the study.

If deemed appropriate by EPA, the results of the treatability study shall be used by the Respondent in the performance of the selected remedy, and any modification thereof. EPA approval of the Treatability Study Final Report shall mean only that EPA finds the study methodology acceptable. EPA approval of the study, results, or the Treatability Study Final Report shall not imply or be construed to mean that EPA is warranting the performance of this or any vendor or technology. Should the treatability study not be approved by EPA, additional treatability studies may be required to fully evaluate the available treatment systems.

5. Draft Design Analyses

The selected design shall be presented along with an analysis supporting the design approach. Design calculations shall be included along with an analysis of the biddability, constructability, and operability of the design.

6. Draft Plans and Specifications

Draft construction drawings and specifications for all components of the Remedial Action shall be prepared and presented. All plans and specifications shall conform with the Construction Specifications Institute Master Format.

7. Draft Construction Schedule

The Respondent shall submit a draft construction schedule to EPA for approval. The schedule shall detail any planned incremental or sequential phasing of the remedial action.

8. Performance Standards Verification Plan

The purpose of the Performance Standards Verification Plan is to provide a mechanism to ensure that both short-term and long-term Performance Standards for the Remedial Action are met. Guidances used in developing

the Sampling and Analysis Plan during the Remedial Design phase shall be used. The Respondent shall submit a Performance Standards Verification Plan with the Final Design. Once approved, The Respondent shall implement the Performance Standards Verification Plan on the approved schedule. The Performance Standards Verification Plan shall include:

1. The Performance Standards Verification Field Sampling and Analysis Plan that provides guidance for all fieldwork by defining in detail the sampling and data gathering methods to be used. The Performance Standards Verification Field Sampling and Analysis Plan shall be written so that a field sampling team unfamiliar with the Site would be able to gather the samples and field information required.
2. The Performance Standards Verification Quality Assurance/Quality Control plan that describes the quality assurance and quality control protocols which will be followed in demonstrating compliance with Performance standards.
3. Specification of those tasks to be performed by the Respondent to demonstrate compliance with all the major components of source control and groundwater remediation, and compliance with the Performance and Compliance Standards, and a binding schedule for the performance of these tasks.

C. Final Design

The Final Design shall be submitted along with a memorandum indicating how EPA's comments and instructions concerning the Draft Design were incorporated into the Final Design. Final Design documents listed below as items 1-4 shall be certified by a Professional Engineer registered in the State of Florida. The RA Work Plan, Construction Management Plan, and Construction Quality Assurance Plan must be reviewed and approved by EPA, and the Construction Health and Safety Plan/Contingency Plan reviewed by EPA, prior to the initiation of the Remedial Action. EPA written approval of the Final Design is required before initiating the RA, unless specifically authorized by EPA. The following items shall be submitted with or as part of the Final Design:

1. Complete Design Analyses

The selected design shall be presented along with an analysis supporting the design approach. Design calculations shall be included.

2. Final Plans and Specifications

A complete set of construction drawings and specifications shall be submitted which describe the selected design.

3. Final Construction Schedule

The Respondent shall submit a final construction schedule to EPA for approval. The schedule shall detail any planned incremental or sequential phasing of the remedial action.

4. Construction Cost Estimate

An estimate +15 percent to -10 percent of actual construction costs shall be submitted.

5. RA Work Plan

A Work Plan which provides a detailed plan of action for completing the RA activities shall be submitted to EPA for review and approval. The objective of this work plan is to provide for the safe and efficient completion of the RA. The Work Plan shall be developed in conjunction with the Construction Management Plan, the Construction Quality Assurance Plan, and the Construction Health and Safety Plan/Contingency Plan, although each plan may be delivered under separate cover. The Work Plan shall include a comprehensive description of the work to be performed and the Final Construction schedule for completion of each major activity and submission of each deliverable.

Specifically, the Work Plan shall present the following:

- a. A detailed description of the tasks to be performed and a description of the work products to be submitted to EPA. This includes the deliverables set forth in the remainder of Task III.
- b. A schedule for completion of each required activity and submission of each deliverable required by the UAO and the SOW.
- c. A project management plan, including provision for monthly reports to EPA and meetings and presentations to EPA at the conclusion of each major phase of the RA. EPA's Project Coordinator and the Respondent's Project Coordinator will meet, at a minimum, on a .

quarterly basis, unless EPA determines that such meeting is unnecessary.

- d. A description of the community relations support activities to be conducted during the RA. At EPA's request, the Respondent shall assist EPA in preparing and disseminating information to the public regarding the RA work to be performed.

6. Construction Management Plan

A Construction Management Plan shall be submitted to EPA for review and approval to indicate how the construction activities are to be implemented and coordinated with EPA during the RA. The Respondent shall designate a person to be a Remedial Action Coordinator and its representative on-site during the Remedial Action, and identify this person in the Plan. This Plan shall also identify other key project management personnel and lines of authority, and provide descriptions of the duties of the key personnel along with an organizational chart. In addition, a plan for the administration of construction changes and EPA review and approval of those changes shall be included.

This document shall also address procurement methods and contracting strategy, phasing alternatives, and contractor and equipment availability concerns. If the construction of the remedy is to be accomplished by the Respondent's "in-house" resources, the document shall identify those resources.

7. Construction Quality Assurance Plan

The Respondent shall develop and implement a Construction Quality Assurance Program to ensure, with a reasonable degree of certainty, that the completed Remedial Action meets or exceeds all design criteria, plans and specifications, and Performance Standards. The Construction Quality Assurance Plan shall be submitted to EPA for review and approval, and shall incorporate relevant provisions of the Performance Standards Verification Plan (see Task V). At a minimum, the Construction Quality Assurance Plan shall include the following elements:

- a. A description of the quality control organization, including a chart showing lines of authority, identification of the members of the Independent Quality Assurance Team (IQAT),

and acknowledgment that the IQAT will implement the control system for all aspects of the work specified and shall report to the project coordinator and EPA. The IQAT members shall be representatives from testing and inspection organizations and/or the Supervising Contractor and shall be responsible for the QA/QC of the Remedial Action. The members of the IQAT shall have a good professional and ethical reputation, previous experience in the type of QA/QC activities to be implemented, and demonstrated capability to perform the required activities. They shall also be independent of the construction contractor.

- b. The name, qualifications, duties, authorities, and responsibilities of each person assigned a QC function.
- c. Description of the observations and control testing that will be used to monitor the construction and/or installation of the components of the Remedial Action. This includes information which certifies that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards. Any laboratories to be used shall be specified. Acceptance/Rejection criteria and plans for implementing corrective measures shall be addressed.
- d. A schedule for managing submittals, testing, inspections, and any other QA function (including those of contractors, subcontractors, fabricators, suppliers, purchasing agents, etc.) that involve assuring quality workmanship, verifying compliance with the plans and specifications, or any other QC objectives. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records and waste disposal records, etc.
- e. Reporting procedures and reporting format for QA/QC activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation.

- f. A list of definable features of the work to be performed. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements.

8. Construction Health and Safety Plan/
Contingency Plan

The Respondent shall prepare a Construction Health and Safety Plan/Contingency Plan in conformance with the Respondent's health and safety program, and in compliance with OSHA regulations and protocols. The Construction Health and Safety Plan shall include a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and site control. EPA will not approve the Respondent's Construction Health and Safety Plan/Contingency Plan, but rather EPA will review it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment. This plan shall include a Contingency Plan and incorporate Air Monitoring and Spill Control and Countermeasures Plans if determined by EPA to be appropriate for the Site. The Contingency Plan is to be written for the onsite construction workers and the local affected population. It shall include the following items:

- a. Name of person who will be responsible in the event of an emergency incident.
- b. Plan to ensure that all employees have received the necessary training and certification. The Respondent is responsible for ensuring that all employees understand and follow the Construction Health and Safety Plan.
- c. Plan and date for notification of neighboring businesses and residents and local, state and federal agencies involved in the cleanup.
- d. A list of the first aid and medical facilities including, location of first aid kits, names of personnel trained in first aid, a clearly marked map with the route to the nearest medical facility, all necessary emergency phone numbers conspicuously posted at the job site (i.e., fire, rescue, local hazardous material teams, National Emergency Response Team, etc.)
- e. Plans for protection of public and visitors to

the job site.

- f. Air Monitoring Plan, if requested by EPA, which incorporates the following requirements:

1) Air monitoring shall be conducted both on Site and at the perimeter of the Site. The chemical constituents that were identified during the Risk Assessment shall serve as a basis of the sampling for and measurement of pollutants in the atmosphere. The Respondent shall clearly identify these compounds and the detection and notification levels required in Paragraph 4 below. Air monitoring shall include personnel monitoring, on-site area monitoring, and perimeter monitoring.

2) Personnel Monitoring shall be conducted according to OSHA and NIOSH regulations and guidance.

3) Onsite Area Monitoring shall consist of continuous real-time monitoring performed immediately adjacent to any waste excavation areas, treatment areas, and any other applicable areas when work is occurring. Measurements shall be taken in the breathing zones of personnel and immediately upwind and downwind of the work areas. Equipment shall include the following, at a minimum: organic vapor meter, explosion meter, particulate monitoring equipment, and onsite windsock.

4) Perimeter Monitoring shall consist of monitoring airborne contaminants at the perimeter of the Site to determine whether harmful concentrations of toxic constituents are migrating off-site. EPA approved methods shall be used for sampling and analysis of air at the Site perimeter. The results of the perimeter air monitoring and the on-site meteorological station shall be used to assess the potential for off-site exposure to toxic materials. The air monitoring program shall include provisions for notifying nearby residents, local, state and federal agencies in the event that unacceptable concentrations of airborne toxic constituents are migrating off-site. The Respondent shall report detection of unacceptable levels of airborne contaminants to EPA in accordance with Section XIV of the UAO.

- g. A Spill Control and Countermeasures Plan which shall include the following:
- 1) Contingency measures for potential spills and discharges from materials handling and/or transportation.
 - 2) A description of the methods, means, and facilities required to prevent contamination of soil, water, atmosphere, and uncontaminated structures, equipment, or material by spills or discharges.
 - 3) A description of the equipment and personnel necessary to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material must be properly disposed of.
 - 4) A description of the equipment and personnel to perform decontamination measures that may be required for previously uncontaminated structures, equipment, or material.

TASK III - REMEDIAL ACTION

Remedial Action shall be performed by the Respondent to implement the response actions selected in the ROD.

A. Remedial Action Planning

Upon approval of the Final Design, including the RA Work Plan, the Respondent shall implement the RA Work Plan in accordance with the construction management plan and final construction schedule. Significant field changes to the RA as set forth in the RA Work Plan and Final Design shall not be undertaken without the approval of EPA. The RA shall be documented in enough detail to produce as-built construction drawings after the RA is complete. Deliverables shall be submitted to EPA for review and approval in accordance with Section XIII of the UAO. Review and/or approval of submittals does not imply acceptance of later submittals that have not been reviewed, nor that the remedy, when constructed, will meet Performance Standards.

B. Preconstruction Conference

A Preconstruction Conference shall be held after selection of the construction contractor but before initiation of construction. Participants at this conference shall include

the Respondent and EPA, and, at EPA's discretion, may also include other federal, state and local government agencies. The purposes of the conference are as follows:

1. Define the roles, relationships, and responsibilities of all parties;
2. Review methods for documenting and reporting inspection data;
3. Review methods for distributing and storing documents and reports;
4. Review work area security and safety protocols;
5. Review the Construction Schedule;
6. Conduct a site reconnaissance to verify that the design criteria and the plans and specifications are understood and to review material and equipment storage locations.

The Preconstruction Conference must be documented, including names of people in attendance, issues discussed, clarifications made, special instructions issued, etc.

D. Prefinal Construction Inspection

Upon preliminary project completion, the Respondent shall notify EPA for the purpose of conducting a Prefinal Construction Inspection. Participants should include the Project Coordinators, Supervising Contractor, Construction Contractor, Natural Resource Trustees and, at EPA's discretion, other federal, state, and local agencies with a jurisdictional interest. The Prefinal Inspection shall consist of a walk-through inspection of the entire project site. The objective of the inspection is to determine whether the construction is complete and consistent with the UAO. Any outstanding construction items discovered during the inspection shall be identified and noted on a punch list. Additionally, treatment equipment shall be operationally tested by the Respondent. The Respondent shall certify that the equipment has performed to effectively meet the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. A Prefinal Construction Inspection Report shall be submitted by the Respondent which outlines the outstanding construction items, actions required to resolve the items, completion date for the items, and an anticipated date for the Final Inspection.

E. Final Construction Inspection

Upon completion of all outstanding construction items, the

Respondent shall notify EPA for the purpose of conducting a Final Construction Inspection. The Final Construction Inspection shall consist of a walk-through inspection of the entire project site. The Prefinal Construction Inspection Report shall be used as a check list with the Final Construction Inspection focusing on the outstanding construction items identified in the Prefinal Construction Inspection. All tests that were originally unsatisfactory shall be conducted again. Confirmation shall be made during the Final Construction Inspection that all outstanding items have been resolved. Any outstanding construction items discovered during the inspection still requiring correction shall be identified and noted on a punch list. If any items are still unresolved, the inspection shall be considered to be a Prefinal Construction Inspection requiring another Prefinal Construction Inspection Report and subsequent Final Construction Inspection.

F. Final Construction Report

Within fifteen (15) days following the conclusion of the Final Construction Inspection, the Respondent shall submit a Final Construction Report. EPA will review the draft report and will provide comments to the Respondent. The Final Construction Report shall include the following:

1. Brief description of how outstanding items noted in the Prefinal Inspection were resolved;
2. Explanation of modifications made during the RA to the original RD and RA Work Plans and why these changes were made;
3. As-built drawings.
4. Synopsis of the construction work defined in the SOW and certification that the construction work has been completed.

G. Remedial Action Report

The respondent shall demonstrate to EPA that the system is functioning properly and is performing as designed. If the remedy is a long term remedial action, such as a pump and treat system for groundwater, then the Respondent shall submit an interim Remedial Action Report. The interim Remedial Action Report shall be submitted 90 days after the Final Construction Inspection. The interim Remedial Action Report shall contain the following items:

1. A copy of the Final Construction Report;
2. Synopsis of the work defined in this SOW and a demonstration in accordance with the Performance Standards Verification Plan that Performance.

Standards have been achieved during initial operation; and that the Performance Standards will be achieved during the long term operation of the system;

3. A description of how Respondent will implement the long term operation and maintenance of the remedy.

As provided in Section IX of the UAO, 30 days after the Respondent concludes that the Remedial Action has been fully performed and the Performance Standards have been attained, the Respondent shall so certify to the United States and shall schedule and conduct a pre-certification inspection to be attended by EPA and the Respondent. If after the pre-certification inspection the Respondent still believes that the Remedial Action has been fully performed and the Performance Standards have been attained, the Respondent shall submit a Remedial Action (RA) Report to EPA in accordance with Section IX of the UAO. The RA Report shall include the following:

1. A copy of the Final Construction Report;
2. Synopsis of the work defined in this SOW and a demonstration in accordance with the Performance Standards Verification Plan that Performance Standards have been achieved;
3. Certification that the Remedial Action has been completed in full satisfaction of the requirements of the UAO, and; the Respondent
4. A description of how Respondent will implement any remaining part of the EPA-approved Operation and Maintenance Plan.

After EPA review, the Respondent shall address any comments and submit a revised report. As provided in Section IX of the UAO, the Remedial Action shall not be considered complete until EPA approves the RA Report.

TASK IV - OPERATION AND MAINTENANCE

Operation and Maintenance (O&M) shall be performed in accordance with the approved Operation and Maintenance Plan.

A. Operation and Maintenance Plan

Concurrent with the submission of the Final Design, the Respondent shall submit a draft Operation and Maintenance Plan for review. If necessary, the Operation and Maintenance Plan shall be modified to incorporate any changes suggested by the results of the Treatability Study or other design modifications implemented during the Remedial Action. The Operation and Maintenance Plan must be reviewed and approved by EPA prior to initiation of Operation and Maintenance.

activities.

Upon approval of the Operation and Maintenance Plan, the Respondent shall implement the Operation and Maintenance Plan in accordance with the schedule contained therein. This plan shall describe start-up procedures, operation, troubleshooting, training, and evaluation activities that shall be carried out by the Respondent. The plan shall address the following elements:

1. Equipment start-up and operator training;
 - a. Technical specifications governing treatment systems;
 - b. Requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the systems; and,
 - c. Schedule for training personnel regarding appropriate operational procedures once start-up has been successfully completed.
2. Description of normal operation and maintenance;
 - a. Description of tasks required for system operation;
 - b. Description of tasks required for system maintenance;
 - c. Description of prescribed treatment or operating conditions; and
 - d. Schedule showing the required frequency for each O&M task.
3. Description of potential operating problems;
 - a. Description and analysis of potential operating problems;
 - b. Sources of information regarding problems; and
 - c. Common remedies or anticipated corrective actions.
4. Description of routine monitoring and laboratory testing;
 - a. Description of monitoring tasks;
 - b. Description of required laboratory tests and

their interpretation;

- c. Required QA/QC; and
 - d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.
5. Description of alternate O&M;
- a. Should system fail, alternate procedures to prevent undue hazard; and
 - b. Analysis of vulnerability and additional resource requirements should a failure occur.
6. Safety Plan;
- a. Description of precautions to be taken and required health and safety equipment, etc., for site personnel protection, and
 - b. Safety tasks required in the event of systems failure.
7. Description of equipment;
- a. Equipment identification;
 - b. Installation of monitoring components;
 - c. Maintenance of site equipment; and
 - d. Replacement schedule for equipment and installation components.
8. Records and reporting;
- a. Daily operating logs;
 - b. Laboratory records;
 - c. Records of operating cost;
 - d. Mechanism for reporting emergencies;
 - e. Personnel and Maintenance Records; and
 - f. Monthly reports to State/Federal Agencies.

TASK V - PERFORMANCE MONITORING

Performance monitoring shall be conducted by the Respondent to ensure that all Performance Standards and Compliance Standards are met. Performance monitoring shall be conducted

by the Respondent in accordance with the EPA-approved Performance Standards Verification (PSV) Plan.

The Respondent should contact EPA prior to the development of the PSV Plan for natural attenuation and monitoring. EPA may determine that the existing sampling plans and/or those developed in conjunction with the RD/RA workplan may be sufficient to substitute for the PSV Plan.

REFERENCES

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RD/RA process. The Respondent shall review these guidances and shall use the information provided therein in performing the RD/RA and preparing all deliverables under this SOW.

1. "National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule", Federal Register 40 CFR Part 300, March 8, 1990.
2. "Superfund Remedial Design and Remedial Action Guidance," U.S. EPA, Office of Emergency and Remedial Response, June 1986, OSWER Directive No. 9355.0-4A.
3. "Interim Final Guidance on Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties," U.S. EPA, Office of Emergency and Remedial Response, February 14, 1990, OSWER Directive No. 9355.5-01.
4. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final," U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 355.3-01.
5. "A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.
6. "EPA NEIC Policies and Procedures Manual," EPA-330/9-78-001-R, May 1978, revised November 1984.
7. "Data Quality Objectives for Remedial Response Activities," U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.
8. "Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.
9. "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.
10. "Users Guide to the EPA Contract Laboratory Program," U.S. EPA, Sample Management Office, August 1982.

11. "Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual," U.S. EPA Region IV, Environmental Services Division, May 1996, (revised periodically).
12. "USEPA Contract Laboratory Program Statement of Work for Organics Analysis," U.S. EPA, Office of Emergency and Remedial Response, February 1988.
13. "USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis," U.S. EPA, Office of Emergency and Remedial Response, July 1988.
14. "Quality in the Constructed Project: A Guideline for Owners, Designers, and Constructors, Volume 1, Preliminary Edition for Trial Use and Comment," American Society of Civil Engineers, May 1988.
15. "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.
16. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (Draft), OSWER Directive No. 9234.1-01 and -02.
17. "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response, (Draft), OSWER Directive No. 9283.1-2.
18. "Guide for Conducting Treatability Studies Under CERCLA," U.S. EPA, Office of Emergency and Remedial Response, Pre-publication Version.
19. "Health and Safety Requirements of Employees Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.
20. "Standard Operating Safety Guides," U.S. EPA, Office of Emergency and Remedial Response, November 1984.
21. "Standards for General Industry," 29 CFR Part 1910, Occupational Health and Safety Administration.
22. "Standards for the Construction Industry," 29 CFR 1926, Occupational Health and Safety Administration.
23. "NIOSH Manual of Analytical Methods," 2d edition. Volumes I - VII, or the 3rd edition, Volumes I and II, National Institute of Occupational Safety and Health.

24. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," National Institute of Occupational Safety and Health/Occupational Health and Safety Administration/United States Coast Guard/Environmental Protection Agency, October 1985.
25. "TLVs - Threshold Limit Values and Biological Exposure Indices for 1987 - 88," American Conference of Governmental Industrial Hygienists.
26. "American National Standards Practices for Respiratory Protection," American National Standards Institute Z88.2-1980, March 11, 1981.
27. "Quality in the Constructed Project - Volume 1," American Society of Civil Engineers, 1990.
28. "Construction Quality Management for Remedial Action and Remedial Design - Waste Containment Systems", U.S. EPA OSWER, October 1992, EPA/540/R-92/073.
29. "Control of Air Emissions from Superfund Air Strippers from Superfund Groundwater Sites", June 1989, U.S. EPA OSWER Directive 9355.0-28.
30. "Estimation of Air Impacts for Air Stripping of Contaminated Water", May 1991, U.S. EPA Office of Air Quality Planning and Standards, EPA-450/1-91-002.

SUMMARY OF THE MAJOR DELIVERABLES FOR THE
REMEDIAL DESIGN AND REMEDIAL ACTION AT
THE CHEVRON CHEMICAL COMPANY SUPERFUND SITE
ORANGE COUNTY, FLORIDA

DELIVERABLE

EPA RESPONSE

TASK I PROJECT PLANNING

No deliverables planned as part of Task I.

TASK II REMEDIAL DESIGN

RD Work Plan (7)	Review and Approve
Sampling and Analysis Plan (7)	Review and Approve
Health and Safety Plan (3)	Review and Comment
Treatability Study Work Plan (5)	Review and Approve
Treatability Study Sampling and Analysis Plan (5)	Review and Approve
Treatability Study Health and Safety Plan (3)	Review and Comment
Draft Design (7)	
Results of Data Acquisition Activities	Review and Comment
Design Criteria Report	Review and Comment
Plan for Satisfying Permitting Requirements	Review and Approve
Treatability Study Final Report (5)	Review and Approve
Draft Design Analyses	Review and Comment
Draft Plans and Specifications	Review and Comment
Draft Construction Schedule	Review and Comment
Performance Standards Verification Plan (5)	Review and Approve
Final Design	
Complete Design Analyses (7)	Review and Approve

Final Plans and Specifications (7)	Review and Approve
Final Construction Schedule (5)	Review and Approve
Construction Cost Estimate (5)	Review and Comment
RA Work Plan (7)	Review and Approve
Construction Management Plan (7)	Review and Approve
Construction Quality Assurance Plan (7)	Review and Approve
Construction Health and Safety Plan/Contingency Plan (5)	Review and Comment

TASK III REMEDIAL ACTION

Prefinal Construction Inspection Report (3)	Review and Approve
Final Construction Report (3)	Review and Approve
Remedial Action Report (3)	Review and Approve

TASK IV OPERATION AND MAINTENANCE

Operation and Maintenance Plan (5)	Review and Approve
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TASK V Monitoring

Performance Standards Verification Plan (5) (see draft design submittals)	Review and Approve
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¹ The number in parenthesis indicates the number of copies to be submitted by the Respondent. One copy shall unbound; the remaining copies shall be bound. The pages should have a size of 8.5" x 11" and be double-sided, where possible. In addition, if requested by EPA, all major deliverables shall be submitted on a 3.5 inch diskette in Wordperfect 6.1 format.

² Sampling and Analysis Plan and Health and Safety Plan shall be prepared, and revised as deemed necessary by EPA, to address all anticipated sampling activities during the RD, Treatability Study, RA, etc.

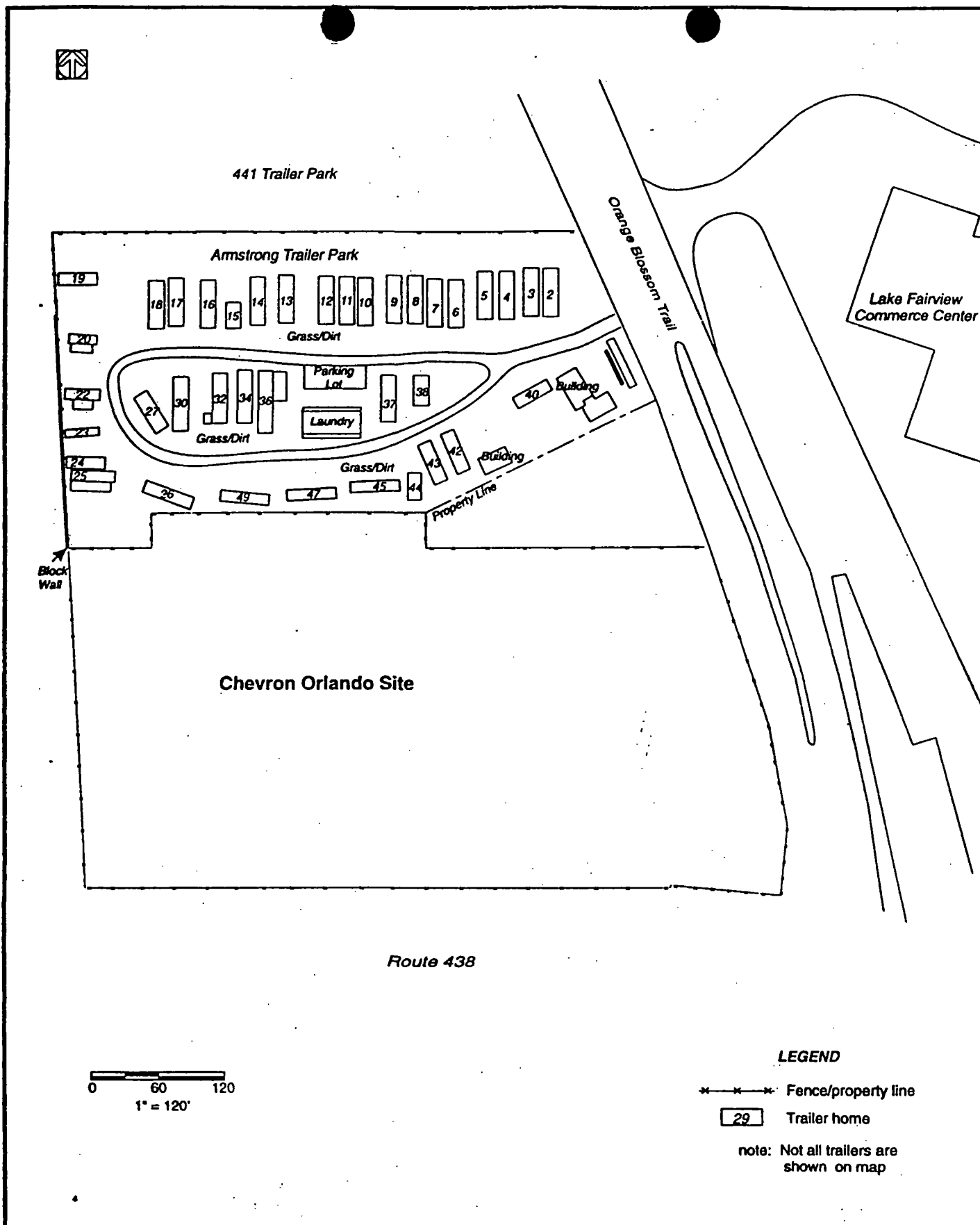


Figure 2. Study area; Chevron, Orlando site.

TASK
ENVIRONMENTAL

PTT Environmental Services